OWOW FY92
National Program Meeting

May 5 - 7, 1992

Washington, DC

OWOW

Office of Wetlands, Oceans & Watersheds

Office of Water, U.S. Environmental Protection Agency

Organization of OWOW FY92 National Program Meeting Notebook

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Office of Wetlands, Oceans and Watersheds

FY92 National Program Meeting

The Washington Plaza Hotel
Massachusetts and Vermont Avenues, NW
Washington, DC 20005

May 5-7, 1992

Agenda

Day One
Tuesday, May 5

7:00 - 8:30am *Meeting Lobby*	Registration	
8:30 - 9:00am *National Hall*	Welcome/Introduction	*Bob Wayland*
9:00 - 10:00am *National Hall*	Keynote Address Questions and Answers *LaJuana Wilcher,* *Assistant Administrator for Water*	
10:00 - 10:15am	Break	
10:15 - 12:00 *National Hall*	Regional Customer Survey	*Louise Wise*
12:00 - 1:00pm *Washington Room*	Lunch Keynote Speaker: *Margot Garcia, Water Quality 2000*	

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FY92 National Program Meeting

1:00 - 2:00pm *National Hall*	**Panel Discussion** **Watershed and Ecosystem Protection** *"How can we strengthen the connection?"* *Gregory Low, The Nature Conservancy* *Scott Feierabend, National Wildlife Federation* *Margot Garcia, Water Quality 2000* *Moderator: Dave Davis*	
2:00 - 3:30pm *National Hall*	**Sharing of Common Program Goals**	*Mike Cook* *Tudor Davies* *Jim Elder*
3:30 - 4:00pm	**Break**	
4:00 - 5:30pm *National Hall*	**Watershed Protection Approach** • *Integrating Targeting Schemes* • *Funding Flexibility* • *Developing and Implementing Integrated Holistic Action Plans* • *Measurement and Monitoring*	*Louise Wise*
5:30 - 6:30pm *Washington Room*	**Social Hour**	
6:30pm *Washington Room*	**Group Buffet Dinner**	

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FY92 National Program Meeting

Day Two
Wednesday, May 6

8:00 - 8:30am *Meeting Lobby*	Registration	
8:30 - 9:00am *National Hall*	Review Agenda/Introduction	*Dave Davis*
9:00 - 9:30am *National Hall*	Keynote Speech *William Richards,* *Chief, Soil Conservation Service*	
9:30 - 11:00am *National Hall*	Panel Discussion -- Agriculture *"Will voluntary approaches work and how?"* *Dale Darling, DuPont* *Roland B. Geddes, National Association of State Conservation Agencies* *Donald Spickler, National Association of Conservation Districts* *Ralph Grossi, American Farmland Trust* *Moderator: Dave Davis*	
11:00 - 11:15am	Break	
11:15 - 12:00 *National Hall*	Stormwater/NPS/CZARA Strategic Integration	*Geoff Grubbs* *Cynthia Dougherty* *Marcella Jensen*

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FY92 National Program Meeting

12:00 - 1:00pm	**Lunch** *on your own*	
1:00 - 4:00pm *Meeting room assignments will be posted.*	**Division Breakout Session** *You will find the Division Agendas following this agenda in your notebook.*	
4:00 - 5:00pm *National Hall*	**OWOW Staff Meeting with the Regions**	
5:15pm *Franklin Room*	**OWOW Staff/Regions Social Event**	
Day Three **Thursday, May 7**		
8:00 - 8:30am *Meeting Lobby*	**Registration**	
8:30 - 9:15am *National Hall*	**Resource Allocation Process for FY93**	*Bernie Mason*
9:15 - 10:30am *National Hall*	**OWOW Wrap-up Session**	*Bob Wayland* *Dave Davis*

Division-specific meeting may continue (Wetlands Division plans to meet until Noon on Friday).

Meeting room assignments will be posted.

Oceans and Coastal Protection Division Agenda

Day Two
Wednesday, May 6

1:00 - 3:00pm

Ocean Dumping Program Issues

- Revised Regulations: Roles of EPA vs. COE on site management, monitoring, enforcement
- Regional Green Book Implementation Manuals
- Role of Capping
- National MOU with COE
- NOAA Marine Sanctuaries
- Status of Inputs to Workload Model
- Amendments to LDC (ind. waste, rad. waste, dredged material guidelines)

3:00 - 4:00pm

NEP: Development of Evaluative Protocols
(Blaine Lines and Harry Hatry, State Policy Center, Urban Institute)

Day Three
Thursday, May 7

10:30am - 12:15pm

Innovative Approaches to Tackling the Decline of Near Shore Marine Areas

Introduction to Project Concept

- Purpose of Session *(Abby Arnold and Bill Eichbaum, Facilitators RESOLVE)*
- Project Concept *(Marian Mlay)*

Facilitated Discussion on How to Go Forward

- What are examples of innovations that go beyond specific controls, that result in program shifts, and that contribute to a more rapid restoration of coastal environments?
- Which of these can be adapted to other regions?
- How should we identify additional solutions that could have broader applications?

12:15 - 1:45pm

NEP Program Issues

- Status of new NEP applications
- CCMP review issues (e.g., CZM)
- Post-CCMP review issues

1:45 - 2:00pm

Wrap-Up

Office of Wetlands, Oceans and Watersheds

FY92 National Program Meeting

Wetlands Division
Agenda

Day One
Tuesday, May 5

8:30am - 5:30pm	OWOW Joint Session (Theme: Watershed Management)
5:30 - 6:30pm	OWOW Social Hour
6:30pm	OWOW Group Dinner

Day Two
Wednesday, May 6

8:30am - 12:00	OWOW Joint Session (Theme: Agriculture)
12:00 - 1:00pm	Lunch (on your own)
1:15 - 4:00pm	Wetlands Division Breakout
1:15pm	Introduction (HQ)
1:30pm	Lead Region Comments
1:45pm	National Strategy: • RA's reaction to LSW/WKR discussion • Working with the public (creating positive perceptions of the national program) • Wetlands Action Strategy
3:45pm	Return to OWOW Meeting

Office of Wetlands, Oceans and Watersheds

FY92 National Program Meeting

Day Three
Thursday, May 7

8:30 - 10:30am	**OWOW Joint Session/Wrap-Up**
10:45 - 11:45am	**Key Issue Updates:** • Suermann (Tulloch) settlement • Delineation Manual • 404(c) updates (Ware Creek, ARCO 3L, Hartz Mountain, Two Forks litigation) • Hoffman Homes decision (7th Circuit)
12:00 - 1:00pm	**Lunch with Speaker** (Steve Gordon, Lane Council of Governments OR Invited)
1:15 - 2:45pm	**White House Plan I: Categorization**
2:45 - 3:15pm	**Break**
3:15 - 4:45pm	**Working with States, Local Governments, and the Private Sector:** • State assistance • National Governors' Association • Wetlands Hotline Annual Report • Public Outreach
4:45 - 5:45pm	**Wetlands Research Plan (ORD)**
7:00pm	**Wetlands Awards Dinner** (Gusti's Restaurant, 1887 M Street, NW, on the corner of 19th & M Streets)

Office of Wetlands, Oceans and Watersheds

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Day Four
Friday, May 8

8:30 - 9:30am	**Army/Corps Perspective on the White House Plan** (Mike Davis, John Studt invited)
9:30 - 11:30am	**White House Plan II:** • (q) MOA • RGLs • State Program General Permits • State Sec. 404 Assumption
11:30 - 12:00	**Follow-Up Actions/Wrap-Up**

Assessment and Watershed Protection Division Agenda

Day Two
Wednesday, May 6

1:00 - 1:30pm	**News Briefs**	*Grubbs*
1:30 - 3:15pm	**Nonpoint Sources** • CZARA guidance and issues • Clean Water Act Recommendations • Agricultural Pollution Prevention • NPS Strategic Plan	*Weitman*
3:15 - 3:30pm	**Break**	
3:30 - 4:00pm	**Budget Issues**	*Grubbs*

Day Three
Thursday, May 7

10:45 - 11:30am	**TMDL** **Water Quality Planning** **Habitat**	*Newton*
11:30 - 12:00	**Regional Wrap-Up**	

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February 13, 1992

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- **Marine Discharge Section** — John Lishman, Acting Chief
- **Ocean Dumping / Marine Debris Section** — David Redford, Chief

Coastal Management Branch
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- **Northeast and Great Lakes Coast Section** — Mark Curran, Acting Chief
- **Southeast-Gulf and West Coasts Section** — Mark Curran, Acting Chief

RESPONSIBLE OFFICES IN THE REGIONS FOR OWOW PROGRAMS (2/14/92)

REGION	Wetlands	NEP/NCW/Oceans	304(l)/305(b)/TMDL NPS/Clean Lakes	Monitoring
1	Water Management Division Water Quality Branch (Ron Manfredonia, 835-3531)			Enviro. Svcs. Div. Monitoring/Enviro. Studies Branch (Carol Wood) (828-4316)
2	Water Management Division Marine & Wetlands Protection Branch (Mario Del Vicario, 264-5170)		Water Standards & Planning Branch (Robert Vaughn) (264-1833)	Enviro.Svcs Div Surveillance & Monitoring Branch (Richard Spear) (340-6685)
3	Environmental Services Division (ESD) Environmental Assessment Branch (Richard Pepino, 597-1181)		Water Mgmt. Div.[1] Program Support Branch (Victoria Binetti) (597-3927)	Enviro.Svcs. Div. Environmental Monitoring (Robert Kramer) (597-9378)
4	Water Management Division Wetlands, Oceans and Watersheds Branch (E. Stallings Howell, 257-2126)			
5	Water Division [2] Water Quality Branch (Ken Fenner, 353-2079)			ESD Monit./QA Branch (Valerie Jones) (353-2306)
6	ESD Federal Activities Branch (Norm Thomas) (255-2260)	Water Management Division [3] Water Quality Management Branch (Richard Hoppers, 255-7135)		ESD Surveillance Branch (Jim Steibing) (255-2284)
7	ARA for Policy & Mgmt (Susan Gordon) Env. Review Branch (Kerry Herndon) (276-7042)		WMD Water Compliance Branch (Larry Ferguson) (276-7034)	ESD Enviro. Monitoring & Compliance Branch (Thomas Holloway) (757-3881)
8	Water Mgmt. Div. State Program Management Branch (Dale Vodehnal) (330-1565)		Water Management Division State Program Management Branch (Dale Vodehnal) (330-1565)	
9	Water Management Division Wetlands, Oceans and Estuaries Branch (Loretta Barsamian, 484-1953)		Water Quality Branch (Cat Kuhlman, 484-2001)	
10	Water Division [4] Environmental Evaluation Branch (Ron Lee) (399-4011)	Office of Coastal Waters (Jack Gakstatter, 399-0966)	Office of Water Planning (Tom Wilson) (399-1354)	Enviro Svcs Div Ambient Mon. & Analysis Branch (Bienvenido Eusebio) (399-0422)

1 - In Region 3, 304(l) and TMDL are managed by the Permits Enforcement Branch (Joseph T. Piotrowski) of the Water Management Division and 305(b) is managed by the Environmental Monitoring and Surveillance Branch of the Environmental Services Division.

2 - In Region 5, 305(b) is managed by the Monitoring and QA Branch of the Environmental Sciences Division.

3 - In Region 6, Oceans issues are managed jointly by the Environmental Sciences Division and the Water Management Division

4 - In Region 10, TMDL is managed by the Ambient Monitoring and Analysis Branch of the Environmental Services Division.

REGIONAL CONTACTS FOR THE NATIONAL ESTUARY PROGRAMS

REGION	NATIONAL ESTUARY PROGRAM	CONTACT	FTS
1	Buzzards Bay	Bruce Rosinoff	835-9448
	Casco Bay	Mark Smith	835-9461
	Long Island Sound	Mel Cote	835-4870
	Massachusetts Bay	Matthew Liebman Carol Kilbride	835-4866 835-3514
	Narragansett Bay	Joanne Sulak	835-3523
2	Delaware Bay	Bob Nyman	264-5565
	Long Island Sound	Eric Stern	264-5283
	New York - New Jersey Harbor	Seth Ausubel	264-6779
3	Delaware Bay	Marria O'Malley Walsh	652-2105
	Delaware Inland Bays	Krista Mendelman	597-3360
4	Albemarle/Pamlico Estuary Study	Ted Bisterfeld	257-1740
	Gulf of Mexico	Lloyd Wise	257-2126
	Indian River Lagoon	Eva Long	257-1740
	Sarasota Bay	Dean Ulock	257-1740
	Tampa Bay	Dean Ulock	257-1740
5	Great Lakes National Program Office	John Piper	353-8030
6	Barataria - Terrebonne	Barbara Keeler	255-6680
	Galveston Bay	Ken Teague	255-6680
	Gulf of Mexico	Laura Radde	255-7135
7 & 8	No National Estuary Programs		
9	San Francisco Bay	Amy Zimpfer	484-1952
	Santa Monica Bay	Paul Jones	484-1984
10	Puget Sound	Jack Gakstatter	399-0966

REGIONAL/HEADQUARTERS CONTACTS FOR OWOW PROGRAMS[1] AS OF 4/15/92

REGION	PROGRAMS												
	WETLANDS	NCW	OCEAN DUMPING	MARINE DEBRIS	403(c)	301(h)	304(l)	305(b)	TMDL	NPS	CLEAN LAKES	MONITORING	WATERSHED PROTECTION APPROACH
1	Douglas Thompson 835-4422	Rosemary Monahan 835-3518	Gwen Ruta 835-4423	Gwen Ruta 835-4423	David Tomey 835-4425	Phil Colarusso 835-4428	David Pincumbe 835-3544	Brian Switzer 860-4377	David Pincumbe 835-3544	Robert Morehouse 835-3513	Warren Howard 835-3515	Diane Switzer 860-4377	Bill Nuzzo 835-3480
2	Dan Montella 264-5170	Janice Rollwagon 264-5170	Bruce Kiselica 264-5692	Paul Molinari 264-2513	Felix Locicero 264-5691	Felix Locicero 264-5691	Rosella O'Conner 264-8479	Pat Pergola 264-5623	Rosella O'Conner 264-8479	Tony Dore 264-2059	Theresa Faber 264-8708	Randy Braun 340-6692	Bob Vaughn 264-1833
3	Barbara D'Angelo 597-9301	Bill Muir 597-2541	Bill Muir 597-2541	Charles App 597-9589	Bill Muir 597-2541		Thomas Henry 597-8243	Chuck Kanetsky 597-8176	Thomas Henry 597-8243	Hank Zygmunt 597-3429	Hank Zygmunt 597-3429	Chuck Kanetsky 597-8176	Rick Pepino 597-1181 Victoria Benetti 597-3927
4	Tom Welborn 257-2126	Bob Lord 257-2126	Bob Howard 257-1740	Bob Howard 257-1740	Roland Ferry 257-1740		Dan Ahern 257-2126	Duane Robertson 257-1040	Jim Greenfield 257-2126	Mary Ann Gerber 257-2126	Howard Marshall 257-2126	Dan Ahern 257-2126	E Stalling Howell 257-2126
5	Doug Ehorn 886-0243	Janet Causey 353-2079					Jane DeRose-Bannem 353-2105	Wayne Davis 886-6233	Robert Pepin 886-1505	Tom Davenport 886-0209	Tom Davenport 886-0209	Wayne Davis 886-6233	Barry DeGraff 886-0147
6	Beverly Ethridge 255-2263	Suzie McKinne 255-6680	George Horvath 255-6680	George Horvath 255-6680	Ken Huffman 255-7115		Russell Bowen 255-7140	Carl Young 255-7145	Sharon Parrish 255-7145	Susan Alexander 255-7140	Mike Bira 255-7140	Charles Hornig 255-2289	Russell Bowen 255-7140 Beverly Ethridge 255-2263
7	Diane Hershberger 276-7573						Bob Steiert 276-7443	John Houlihan 276-7432	John Houlihan 276-7432	Julie Elfving 276-7475	Donna Sefton 276-7500	Tom Holloway 276-3881	John Houlihan 276-7432 Kerry Herndon 276-7042
8	Gene Reetz 330-1570						Bruce Zander 330-1580	Tony Ott 330-1573	Bruce Zander 330-1580	Roger Dean 330-1571	David Rathke 330-1574	David Vana-Miller 330-5061	Bill Wunthele 330-1586
9	Phil Oshida 484-1971	Suzanne Marr 484-1963	Janet Hashimoto 484-1156	Aaron Setran 484-1967	Janet Hashimoto 484-1156	Janet Hashimoto 484-1156	Tom Johnson 484-2006	Laura Tom 484-2006	David Smith 484-2019	Javita Parjarill 484-2011	Wendell Smith 484-2018	Ed Lu 484-2012	Cat Kuhlman 484-7001
10	William M Riley 399-1412	Jack Gakstatter 399-0966	John Malek 399-1282	John Armstrong 399-1368	Chuck Rice 399-8504	Carla Fisher 399-1756	Rick Albright 399-8514	Gretchen Hayslip 399-1685	Bruce Cleland 399-2600	Elbert Moore 399-4181	Judith Leckrone 399-6911	Gretchen Hayslip 399-1685	Rick Albright 399-8514 Jack Gakstatter 399-0966
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[1]Contacts for the National Estuary Programs are listed separately

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EARGLE, FRANCES	WSSPB	260-1954	719-FC	260-8000	A-104F
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FRANCZAK, STANLEY	WSSPB	260-9908	717-FC	260-8000	A-104F
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WILLIAMS, LORI	WSSPB	260-5084	719-FC	260-8000	A-104F

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FARREN, BRIGITTE	MPCB	260-9119	725B-FC	260-6689	WI-556F
FLORY, MARK	CMB	260-6504	811Y-FC	260-6294	WI-556F
FOX-NORSE, V.	MPCB	260-9129	725B-FC	260-6689	WI-556F
GLOMB, STEPHEN J.	CTB	260-6414	811U-FC	260-6294	WI-556F
HALL, JOSEPH N.	CTB	260-9082	811AA-FC	260-6294	WI-556F
HALL, RAYMOND E.	CTB	260-1998	811Q-FC	260-6294	WI-556F
HANSFORTH, FLO	CTB	260-8448	725--FC	260-6689	WI-556F
HITCH, SUSAN S.	MPCB	260-9178	725H-FC	260-6689	WI-556F
JONES, DELOIS	CMB	260-6502	811--FC	260-6294	WI-556F
KING, JOANN R.	MPCB	260-8448	725--FC	260-6689	WI-556F
KLIMA, KAREN S.	CTB	260-9130	811X-FC	260-6294	WI-556F
LISHMAN, JOHN	MPCB	260-8448	725E-FC	260-6689	WI-556F
LOEB, GEORGE	CTB	260-6074	811-FC	260-6294	WI-556F
MCLEAN, EDWARD	CTB	260-9122	811U-FC	260-6294	WI-556F
MLAY MARIAN	IO	260-1952	811D-FC	260-6294	WI-556F
NICKERSON, DONNA	CMB	260-9038	811Z-FC	260-6294	WI-556F
O'DELL, MARCELYN	CTB	260-1904	725D-FC	260-6689	WI-556F
PAN, PAUL	IO	260-9111	811TT-FC	260-6294	WI-556F
PERRY, KEVIN L.	CTB	260-6833	811U-FC	260-6294	WI-556F
PRYOR, MARGHERITA	CMB	260-9176	811V-FC	260-6294	WI-556F
REDFORD, DAVID	MPCB	260-9179	725G-FC	260-6689	WI-556F
REPSER, WANDA R.	CTB	260-6097	811--FC	260-6294	WI-556F
SALTER, JOEL H.	MPCB	260-8484	725C-FC	260-6689	WI-556F
SANZONE, STEPHANI	CMB	260-9137	811V-FC	260-6294	WI-556F
SMITH, PEARL W.	IO	260-1952	811--FC	260-6294	WI-556F
SPARROW, TIFFANY	CMB	260-6502	811--FC	260-6294	WI-556F
STAHL, LEANNE L.	CMB	260-9799	811V-FC	260-6294	WI-556F
TAM, ELIZABETH L.	CMB	260-6466	811Y-FC	260-6294	WI-556F
THOMPSON, NADEEN	CMB	260-6502	811--FC	260-6294	WI-556F
VEILLEUX, NICOLE	CTB	260-1981	811--FC	260-6294	WI-556F
VILLANUEVA, EDNA	CTB	260-6509	725C-FC	260-6689	WI-556F
VOGT, CRAIG	IO	260-1952	811C-FC	260-6294	WI-556F

ASSESSMENT & WATERSHED PROTECTION DIVISION (AWPD)

IMMEDIATE OFFICE (IO)
MONITORING BRANCH (MB)
WATERSHED BRANCH (WB)
NONPOINT SOURCE CONTROL BRANCH (NSCB)

NAME	BRANCH	TELEPHONE NO.	ROOM NO.	FAX NO.	MAIL CODE
BALLARD, PAULETTE	WB	260-9588	829--ET	260-7024	WH-553
BAUCOM, HERMAN M.	MB	260-7021	744--ET	260-7024	WH-553
BEIER, ANN E.	NSCB	260-7108	833--ET	260-7024	WH-553
BELEFSKI, MARY L.	MB	260-7061	841--ET	260-7024	WH-553
BRADY, DONALD J.	WB	260-5368	737D-ET	260-7024	WH-553
BROSSMAN, MARTIN	WB	260-7023	837--ET	260-7024	WH-553
BUIE, LYNDA F.	NSCB	260-7085	829--ET	260-7024	WH-553
BURGAN, BARRY	MB	260-7010	743--ET	260-7024	WH-553
CANNELL, JOHN R.	NSCB	260-7087	927A-ET	260-7024	WH-553
CLIFFORD, JOHN J.	MB	260-3667	927B-ET	260-7024	WH-553
CRAIG, DORA G.	MB	260-7031	835C-ET	260-7024	WH-553
DRABKOWSKI, EDWIN	NSCB	260-7009	843--ET	260-7024	WH-553
DRESSING, STEVEN	NSCB	260-7110	833--ET	260-7024	WH-553
FAULKNER, CHRIS	MB	260-6228	743--ET	260-7024	WH-553
FREDERICK, RODNEY	NSCB	260-7054	835B-ET	260-7024	WH-553
GOO, ROBERT L.	NSCB	260-7025	843--ET	260-7024	WH-553
GREEN, MADELINE	MB	260-7032	835--ET	260-7024	WH-553
GRUBBS, GEOFFREY	IO	260-7040	837--ET	260-7024	WH-553
HARLLEE, NINA S.	MB	260-7017	846--ET	260-7024	WH-553
HARRIS, PAMELA J.	NSCB	260-8077	837--ET	260-7024	WH-553
HOELMAN, LOUIS	MB	260-7050	835--ET	260-7024	WH-553
HOLLINGSWORTH, T.	WB	260-7840	827--ET	260-7024	WH-553
IOSCO, ROBERT	NSCB	260-7104	833--ET	260-7024	WH-553
JESTER, ELIZABETH	MB	260-7062	835--ET	260-7024	WH-553
KING, ROBERT E.	MB	260-7068	835--ET	260-7024	WH-553
KOSCO, JOHN A.	NSCB	260-7085	839--ET	260-7024	WH-553
KUNKOSKI, DONALD	WB	260-7103	832--ET	260-7024	WH-553
LAPENSEE, PATRICK	WB	260-7105	829--ET	260-7024	WH-553
MAYIO, ALICE E.	MB	260-7018	743--ET	260-7024	WH-553
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for

The Nature Conservancy

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Office of Wetlands, Oceans, and Watersheds National Program Meeting

May 5-7, 1992
Washington, D.C.

Customer Survey Results

EPA

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Carol Wood

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Dan Montello
Janice Rollwagon
Robert Vaughn

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Victoria Binetti
Chuck Kanetsky
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Richard Pepino

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Tom Welborn

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Richard Hoppers
George Horvath

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Doug Lipka

Region VII

Larry Ferguson
Kerry Herndon
John Houlihan

Region VIII

Dale Vodehnal

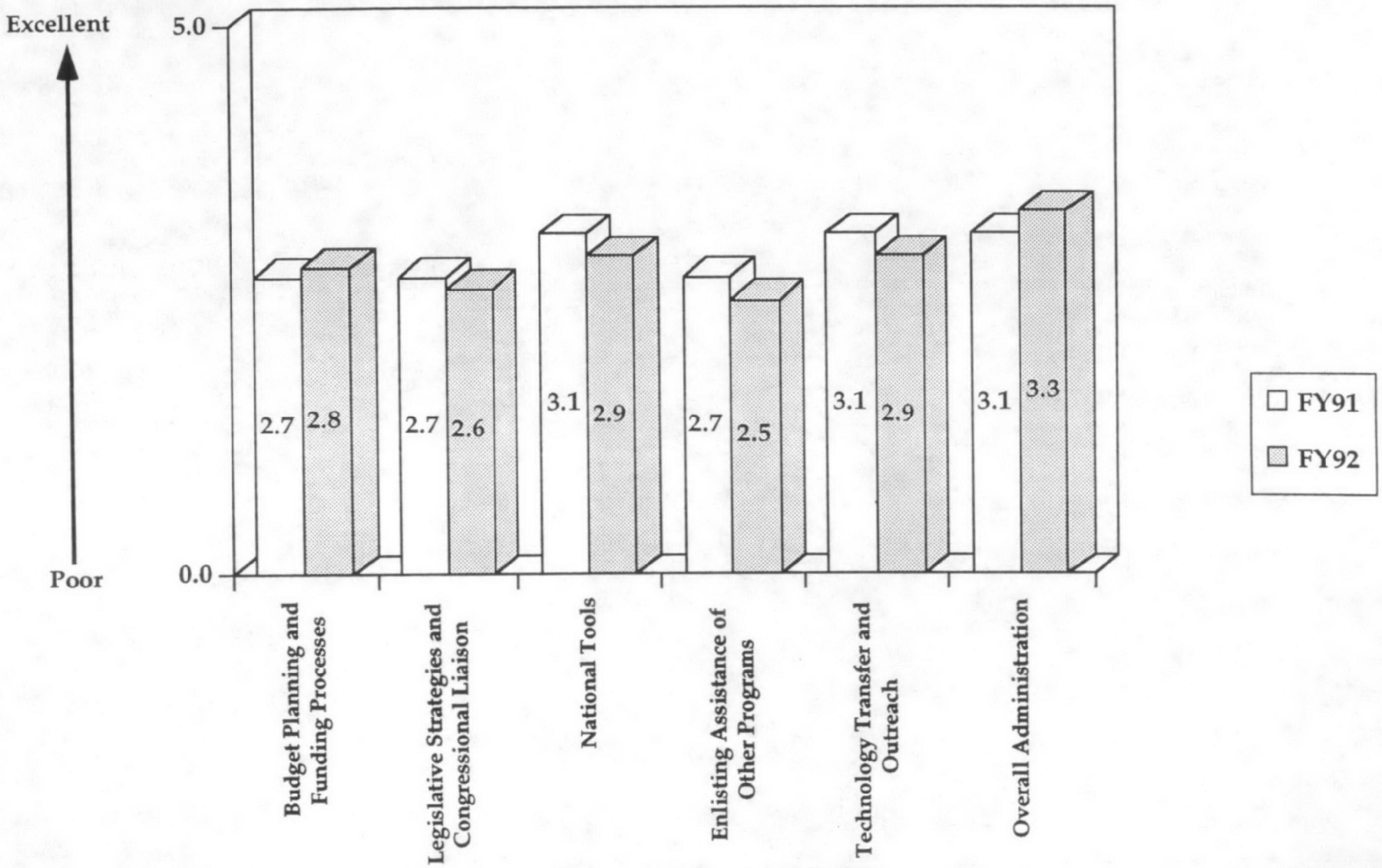
Region IX

Catherine Kuhlman
Amy Zimpfer

Region X

Jack Gakstatter
Ron Lee
Kerrie Schurr

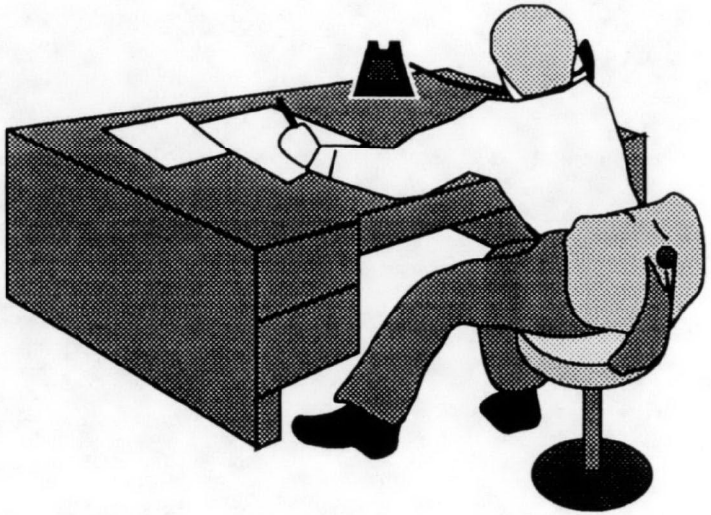
OWOW-Wide Average Rankings by Service



OWOW-Wide
FY92 Survey Results

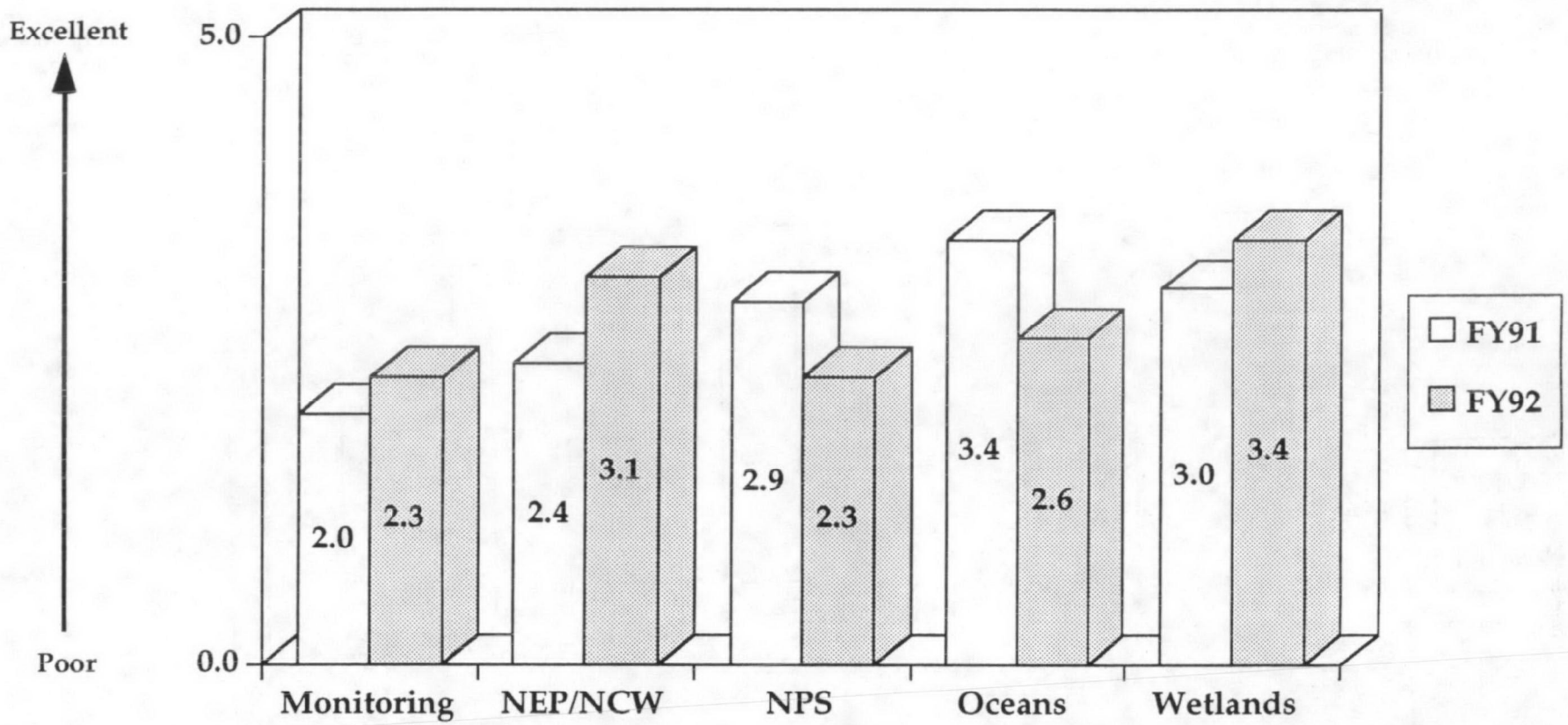
Since FY91, Have Services Improved, Declined, or Stayed About the Same? (# of responses)

Service	Improved	Declined	Same
Budget Development and Funding Processes	14	5	19
Legislative Strategies and Congressional Liaison	4	10	23
National Tools	14	8	15
Enlisting Assistance of Other Programs	8	4	26
Technology Transfer and Outreach	11	2	24
Overall Administration	14	2	22



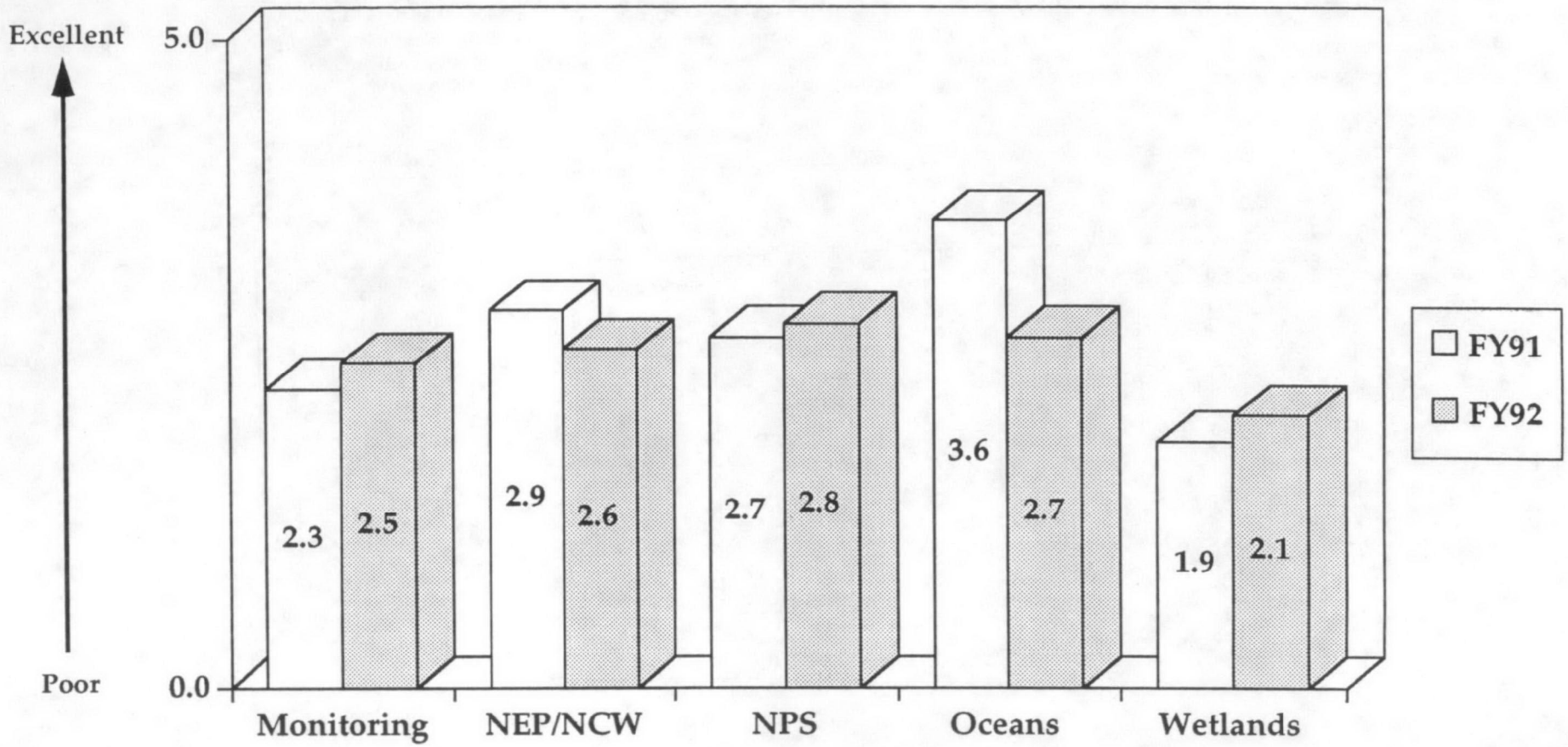
Program-Specific Rankings by Service

Budget Planning and Funding Processes



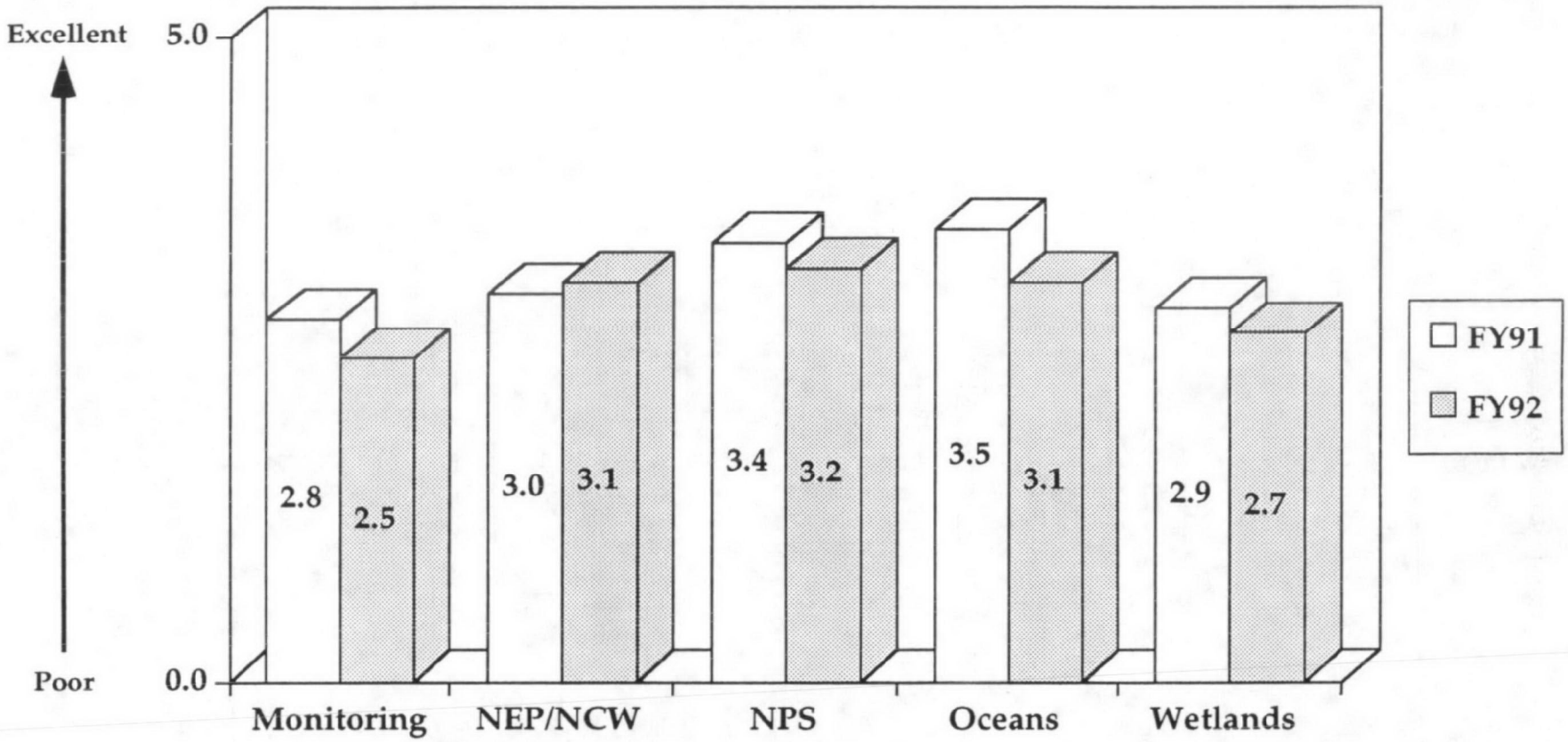
Monitoring	NEP/NCW	NPS	Oceans	Wetlands
■ Resource losses continue ■ Concern about merger with NPS program ■ Still unclear about FY93 $	■ Some improvements in getting $ to the Regions ■ Need to show resource allocations to specific areas ■ Would prefer to receive $ early and let Regions hold till workplans approved ■ Workplan reviews still late	■ Good $ flow to Regions ■ 319 travel $ is significant issue re ability to oversee projects; HQ management should play stronger role	■ Workload model rework underway ■ 403 $ very late decisions	■ Better $ flow to Regions ■ Still need to be more aggressive and show leadership in budget development process

Legislative Strategies and Congressional Liaison



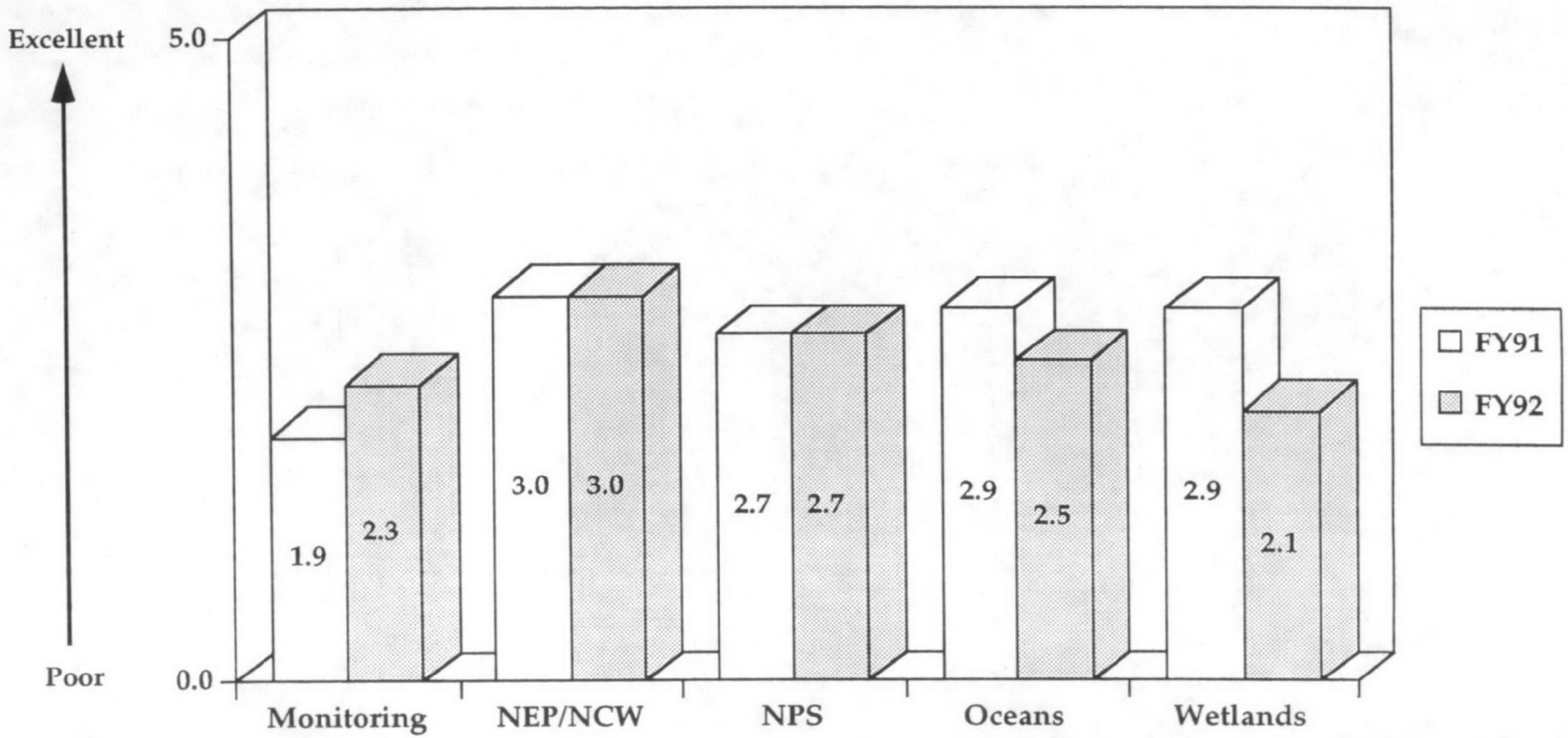
Monitoring	NEP/NCW	NPS	Oceans	Wetlands
■ Need more information about Hill activities, particularly re USGS	■ Need more regular information about Hill activities ■ Should be far more aggressive with CWA	■ Very little feedback	■ Lack of communication	■ Still lack strategy ■ Need to be more aggressive

National Tools



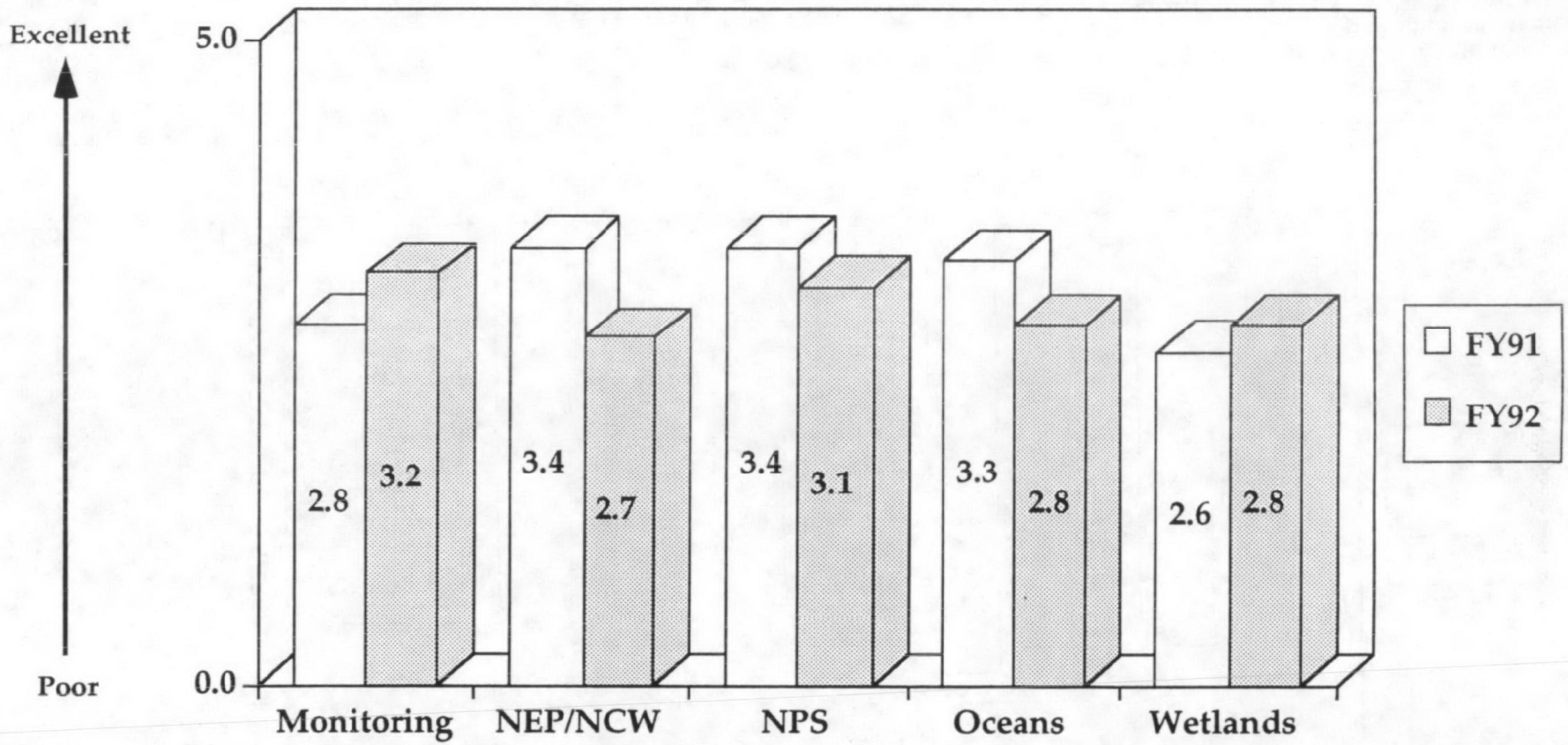
Monitoring	NEP/NCW	NPS	Oceans	Wetlands
■ Some progress ■ Still need mission statement ■ Problems with waterbody tracking system	■ NEP guidance too late for effective use ■ NCW still unclear	■ Need policy on grants/administrative issues ■ Good job with CZM guidance, but other areas neglected ■ Need to work with Regions on documenting success	■ 403 forgotten ? ■ Ocean dumping regs/COE MOUs underway but behind schedule	■ Not much has happened ■ Need to work more aggressively with COE and FWS and agricultural community

Enlisting Assistance of Other Programs



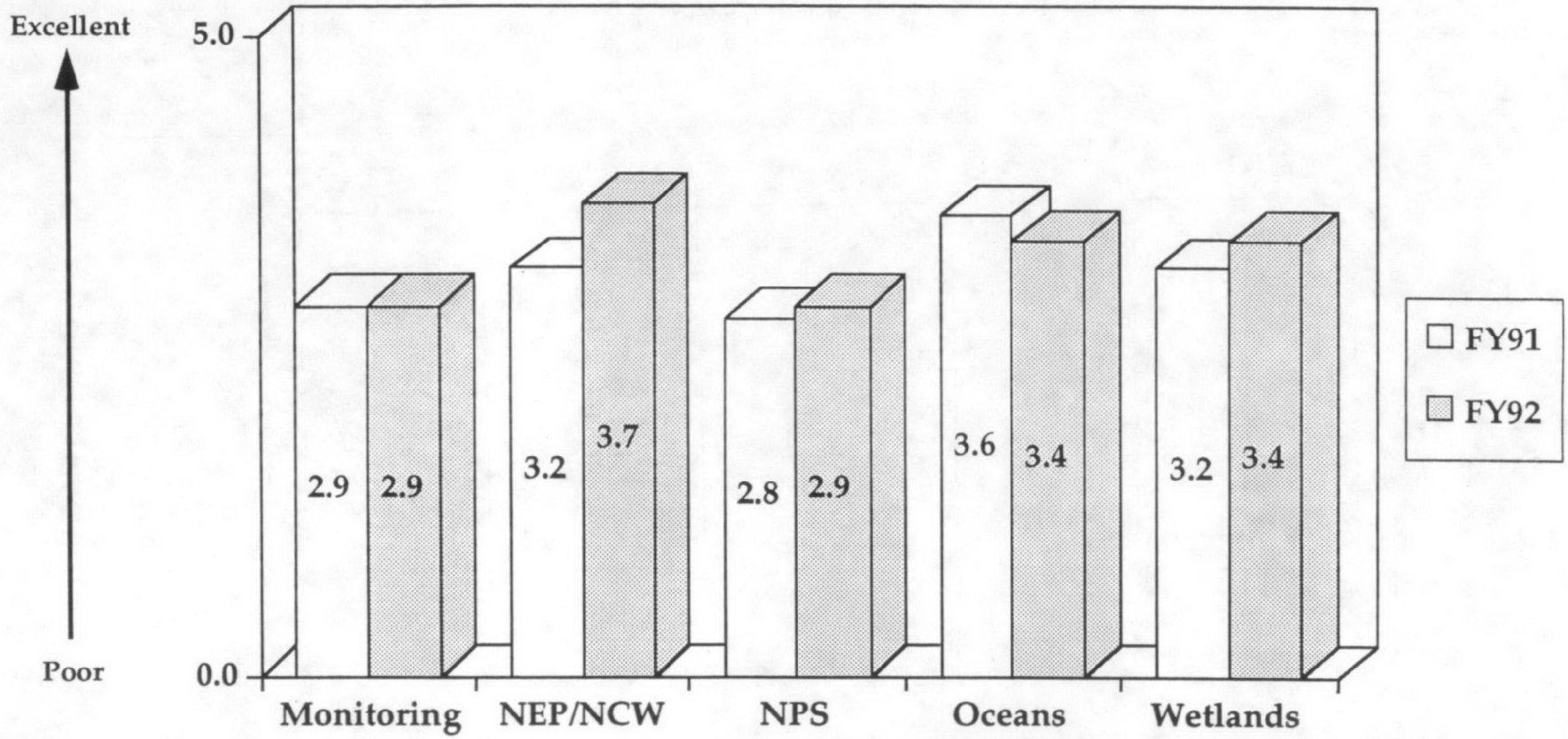
Monitoring	NEP/NCW	NPS	Oceans	Wetlands
■ Some work underway but need tools to be more effective ■ Many workgroups operating from D.C. so results not visible to all	■ Positives with NOAA ■ Try to reach out more ■ Could have used NCW/NCMP more effectively	■ Continue work on TMDLs with OST/ORD/monitoring ■ Work with NOAA on CZM ■ Need better integration with OPPE/OPTS -- agriculture initiatives	■ More interaction needed on EMAP, municipal NPDES with OWEC, sediment issues ■ Coordination with Wetlands better	■ Too internally focused ■ Should be networking more with local, state, and environmental organizations

Technology Transfer and Outreach

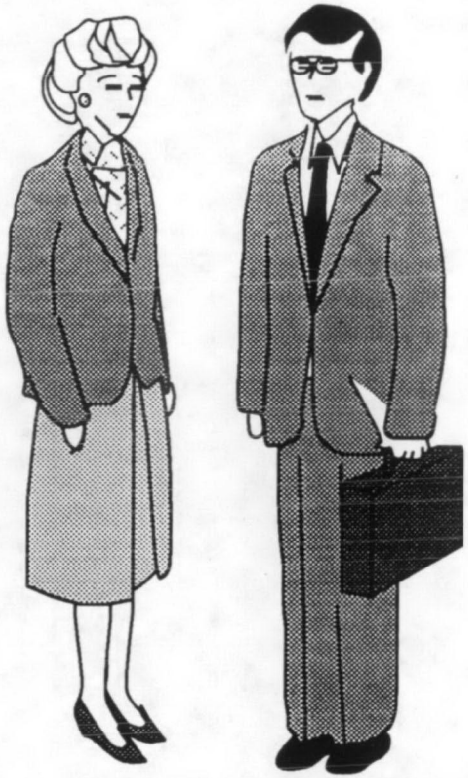


Monitoring	NEP/NCW	NPS	Oceans	Wetlands
■ Good interagency work and citizen monitoring efforts	■ More action and less strategies ■ Should lead in transferring success among NEPs, Chesapeake Bay, etc. ■ Need annual tech transfer meeting ■ More on action demonstration projects	■ Newsletter still great ■ Monthly updates good addition ■ 6217 efforts good ■ Lots more can be done	■ Needs more attention	■ Agriculture outreach paper is good ■ However, outreach in general needs more emphasis and discussion

Overall Administration

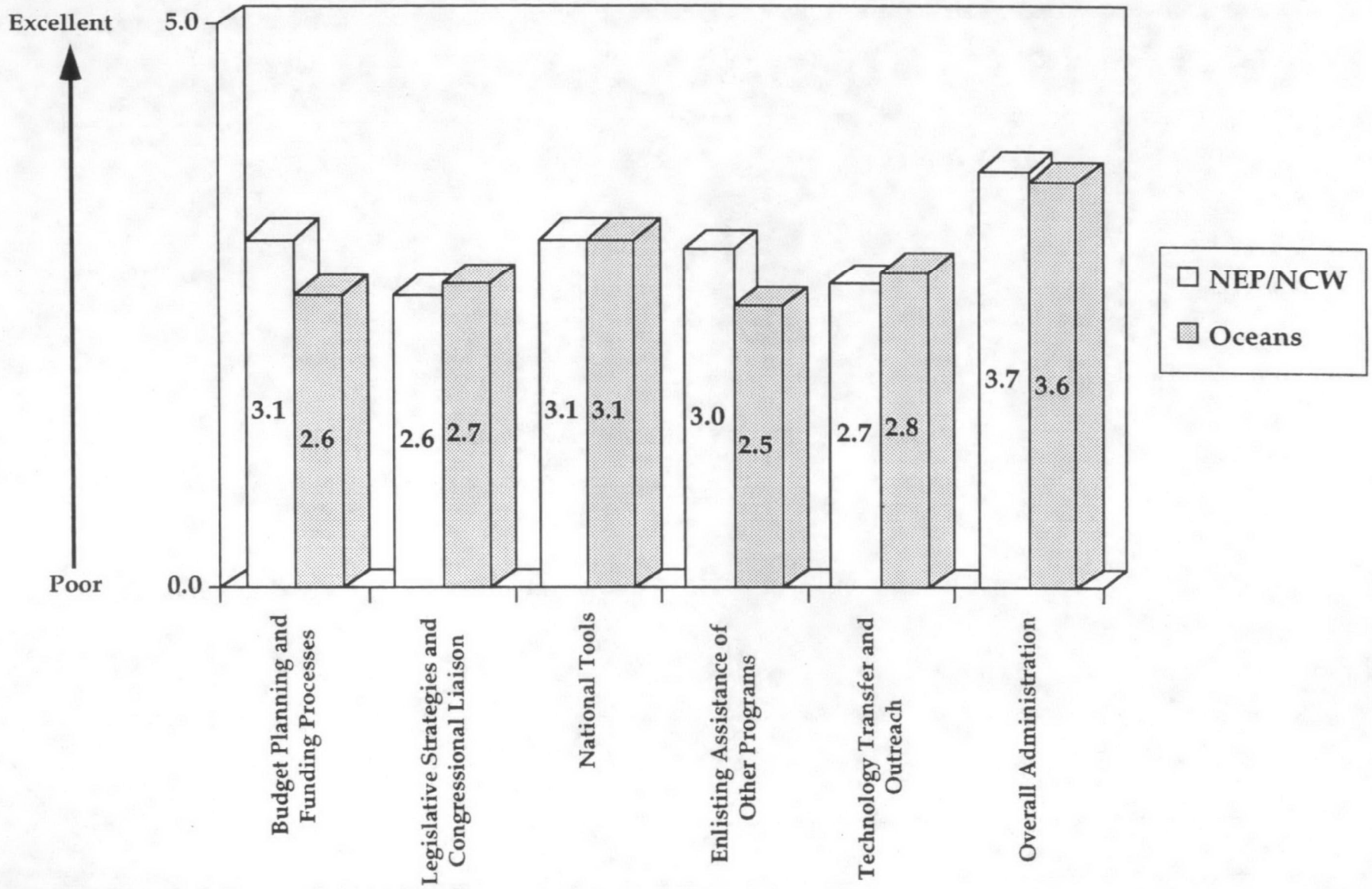


Monitoring	NEP/NCW	NPS	Oceans	Wetlands
■ Many new initiatives underway ■ Signs are encouraging	■ Excellent support ■ Good working relationships	■ Regional liaisons are very helpful ■ Still need to work on program priorities/ vision	■ Regions do a lot of initiating ■ Little HQ outreach	■ Trying, still need to get on top of administration priorities, become more of a force ■ Make better use of Regional expertise and make Regions integral partners



Division Rankings by Service

Oceans and Coastal Protection Division
FY92 Survey Results



Oceans and Coastal Protection Division FY92 Survey Results

Since FY91, Have Services Improved, Declined, or Stayed About the Same? (# of responses)

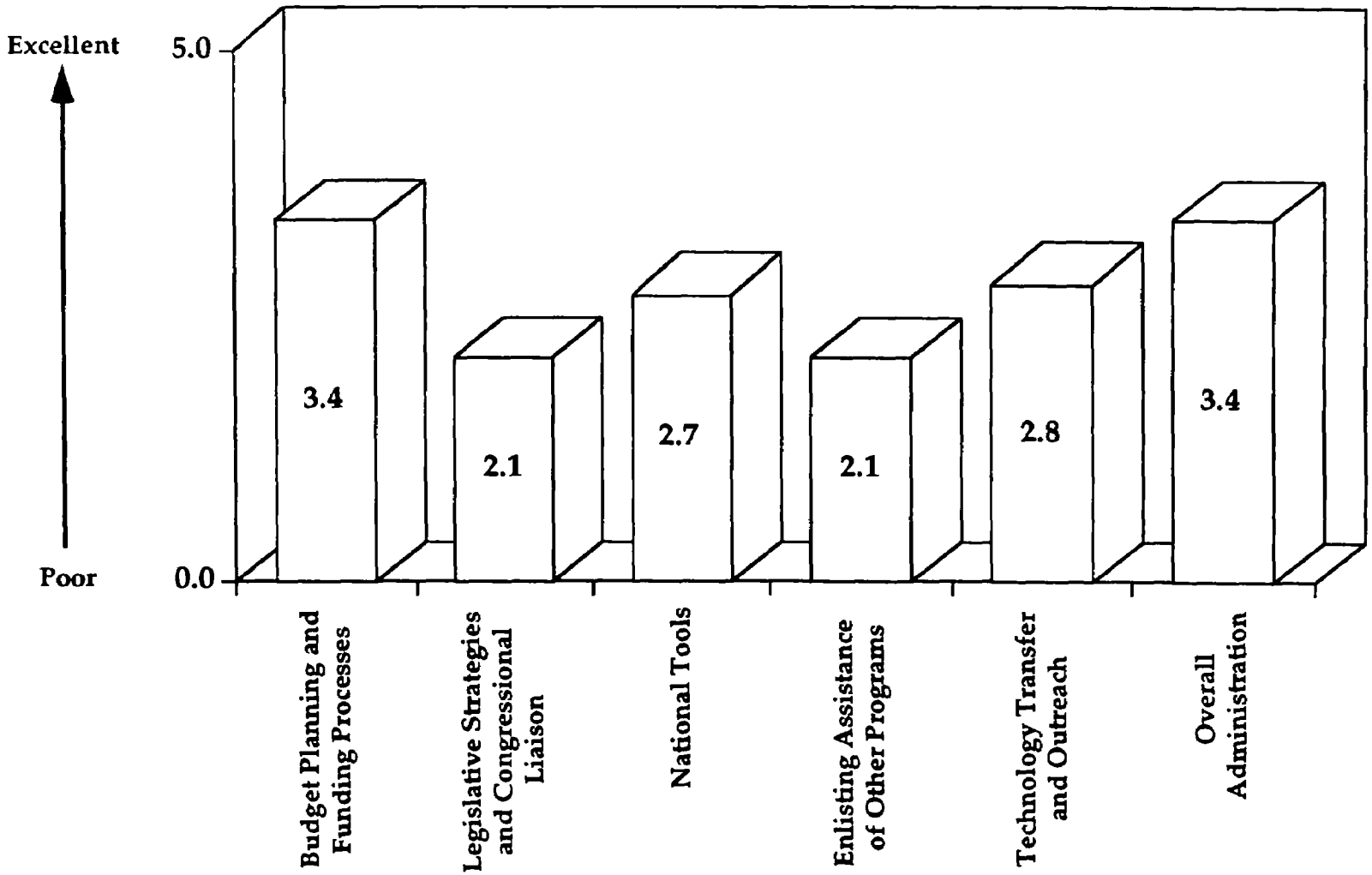
NEP/NCW

Service	Improved	Declined	Same
Budget Development and Funding Processes	6	0	2
Legislative Strategies and Congressional Liaison	0	4	4
National Tools	4	2	1
Enlisting Assistance of Other Programs	3	1	4
Technology Transfer and Outreach	1	1	6
Overall Administration	3	0	5

OCEANS

Service	Improved	Declined	Same
Budget Development and Funding Processes	3	3	1
Legislative Strategies and Congressional Liaison	0	2	4
National Tools	3	1	3
Enlisting Assistance of Other Programs	1	1	5
Technology Transfer and Outreach	1	1	4
Overall Administration	2	0	5

Wetlands Division
FY92 Survey Results

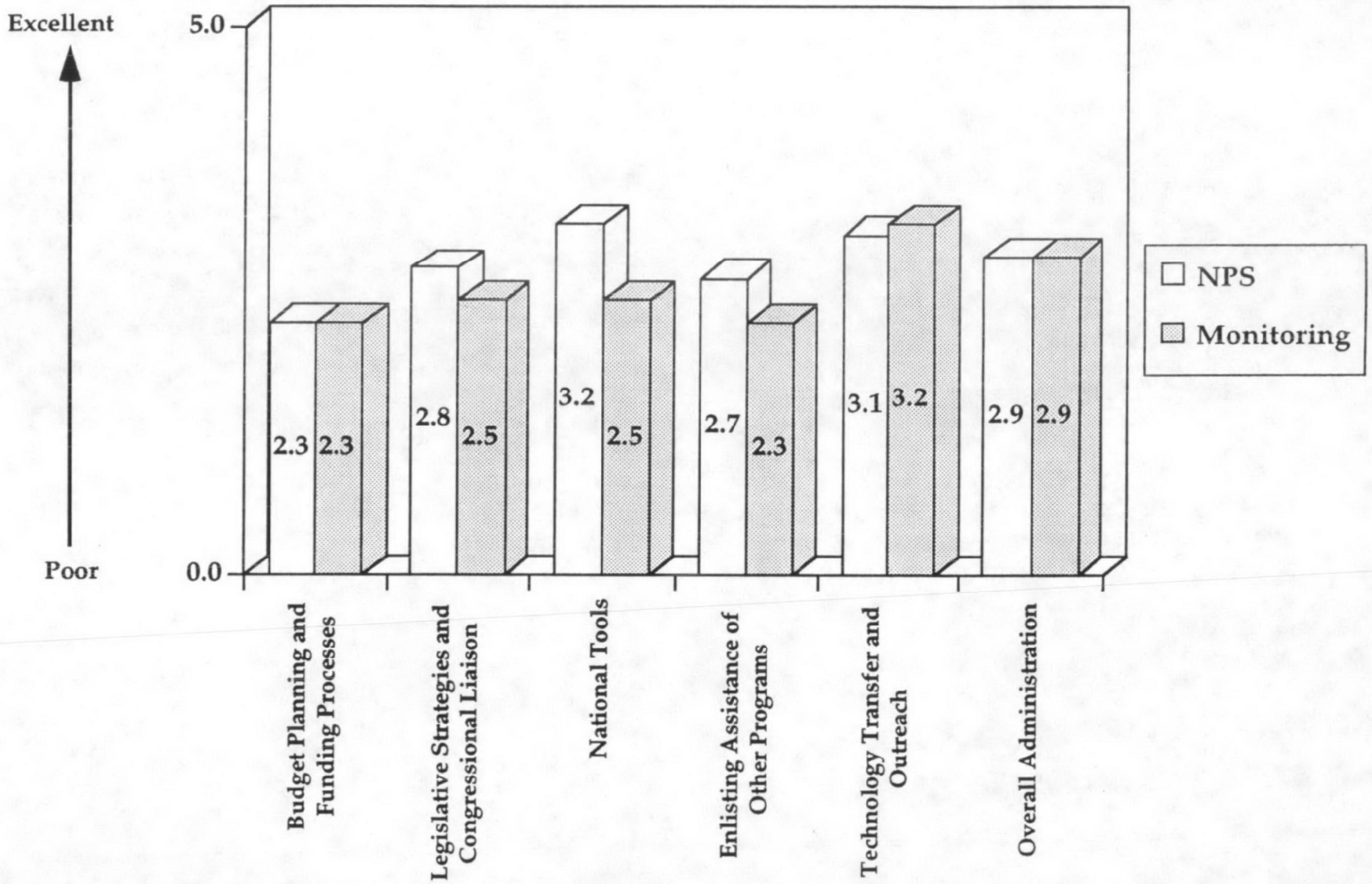


Wetlands Division
FY92 Survey Results

Since FY91, Have Services Improved, Declined, or Stayed About the Same? (# of responses)

Service	Improved	Declined	Same
Budget Development and Funding Processes	3	0	6
Legislative Strategies and Congressional Liaison	1	3	5
National Tools	0	1	8
Enlisting Assistance of Other Programs	0	1	8
Technology Transfer and Outreach	3	0	6
Overall Administration	2	1	6

Assessment and Watershed Protection Division FY92 Survey Results



Assessment and Watershed Protection Division FY92 Survey Results

Since FY91, Have Services Improved, Declined, or Stayed About the Same? (# of responses)

MONITORING

Service	Improved	Declined	Same
Budget Development and Funding Processes	2	0	4
Legislative Strategies and Congressional Liaison	2	0	4
National Tools	2	2	2
Enlisting Assistance of Other Programs	2	0	4
Technology Transfer and Outreach	4	0	2
Overall Administration	5	0	1

NPS

Service	Improved	Declined	Same
Budget Development and Funding Processes	0	2	6
Legislative Strategies and Congressional Liaison	1	1	6
National Tools	5	2	1
Enlisting Assistance of Other Programs	2	1	5
Technology Transfer and Outreach	2	0	6
Overall Administration	2	1	5

OFFICE OF WETLANDS, OCEANS AND WATERSHEDS RESULTS OF CUSTOMER SURVEY

April 1992

COMMENTS AND SUGGESTIONS ON OVERALL OWOW SUPPORT

COMMUNICATIONS: General improvement -- OWOW has listened and been responsive to Regional needs and suggestions. Signs are positive for continuing improvements.

ORGANIZATION: Structure is sound and roles and responsibilities, for the most part, are clear. A few issues still remain with TMDLs, WPA, environmental indicators. Great waterbody programs do not feel well represented, are not part of regular communication networks, and perceive conflicts between OWOW and OW on who is in charge.

PLANNING AND BUDGETING: Could still make improvements on an integrated budget -- and use existing grants to focus more on environmental benefits.

PROGRAM AGENDAS: Improvements in engaging Regions in these discussions -- keep it up.

LEGISLATION: Regions still have concerns. Be aggressive in CWA effort and keep pushing on wetlands -- communicate and keep Regions involved.

ENLISTING ASSISTANCE OF OTHERS: Need particularly to focus on other agencies -- more can be done here. Approaches like WPA should help. NCMP was making contributions. May take higher level involvement.

NATIONAL MEETINGS: Good work! Generally well planned and facilitated, responsive to Regional comments. Could focus more on cross-Division issues. Need Division-specific agendas earlier. Some preference for OWOW-wide meeting in fall and Division-specific meetings in the spring for budget planning. Some problems with coverage of breakouts.

CONFERENCE CALLS: All three Divisions have responded to this suggestion and these are very useful for information exchange. Would be even better with advance agendas -- a little more planning -- so Regions can determine appropriate participation. Should explore more use of videoconferences.

INFORMATIONAL MATERIALS: Good informational packages from OWOW and better distribution. Legislative updates must be continued. AWPD in particular provides good, useful information. Keep key contacts list up to date.

REGIONAL REVIEWS: A few have happened -- and were well planned -- but could have been more focused on issues of Regional concern. OST and perhaps others should have participated in certain sessions.

REQUESTS FOR COMMENT: Improvements in comment periods.

OPPORTUNITIES/ISSUES FOR OFFICE DIRECTOR ATTENTION

BUILDING A COMMON VISION

- Watershed Protection Approach could be used more effectively to provide an OWOW identity as well as integrate programs within OWOW, EPA, and other federal agencies. WPA is not currently being pursued with equal vigor across OWOW.

CLEAN WATER ACT REAUTHORIZATION

- Consider needs for implementation resources, such as NEP capitalization projects; flexibility; support for WPA.

BUILDING STATE CAPACITY

- Need to find innovative ways to build relationships and build capacity for OWOW programs, Wetlands in particular.

- Review current resource allocations under 106 and ensure appropriate guidance is developed for use of these funds.

- Watch for duplicative efforts on initiatives -- Coastal America, NCW, etc.

MONITORING

- Continue efforts to use data and assessments to drive other program decisions. Need to produce the monitoring mission statement as well as work out interagency agreements.

- Continue work on bioassessments/ecoregions.

NATIONAL ESTUARY PROGRAM/NEAR COASTAL WATERS

- Continue commitment to federal role in the NEP, post CCMP. Open dialogue with the NEPs on how to sustain momentum beyond just resources. Look for CWA opportunities.

- Assure sound criteria/justifications for new NEP projects.

- NCW still needs work -- a definition and how this program fits within the overall coastal protection framework. Perhaps it should be used to target specific themes like SAV, coral reefs, etc.

- Coastal America must also be defined within an overall coastal protection framework. If this continues to be a viable program, must work to streamline selection and budgeting process.

NONPOINT SOURCES

- Needs a national framework to define roles and responsibilities among federal agencies – EPA, Agriculture, NOAA, etc., areas of emphasis and implementation strategies.

- Develop a budget strategy to support the above.

OCEANS

- Renew attention to 403 issues.

WETLANDS

- Must maintain viable presence in this program -- COE is becoming more assertive about their role and too little coming from EPA HQ. Develop plans/options for implementing current policy.

- Outreach is critical -- to build alliances with state and local governments and the environmental community and to convey information to the public.

DIVISION AGENDAS: OCEAN AND COASTAL PROTECTION DIVISION

NEP/NCW

- Continue working on support to NEPs, post CCMP. Look for creative ways to sustain momentum, like customer/supplier agreements.
- Work with NEPs and other geographic programs to foster support for improved water quality standards and criteria to protect living resources.
- Provide more technology transfer and hands-on learning opportunities for NEPs and other geographic programs.
- Provide more support for Action Demonstration projects and look at tech transfer needs.
- Analyze overall data management needs and access to data and information.
- Work on definition and direction for NCW program -- currently too weak and vulnerable to taps.
- Work more closely with the Regions on the need for new strategies/workshops and other new initiatives.
- Very helpful in Gulf of Mexico legislative support

Oceans

- Continue work on ocean dumping regulations and national MOU with COE.
- Continue efforts on ocean dumping enforcement.
- Continue work on sediment strategy.
- Review recent ocean dumping coordinators meeting -- need better planning.
- Renew attention to the 403 program, both issues and budget allocation process.
- Clarify role of Coastal Technology Branch.
- Encourage details/rotations of 403 staff to get better understanding of permit issuance process
- Continue 403/301h national meetings
- Need monthly updates on 403/301h

DIVISION AGENDAS: ASSESSMENT AND WATERSHED PROTECTION DIVISION

NPS

- Work on NPS and monitoring budget issues -- resource allocations between the two programs, NPS travel $ for appropriate oversight, diversion of 319 $ to CZM and Gulf of Mexico.
- Need a NPS mission statement/program integration strategy with clear roles and responsibilities.
- Continue work on NPS national grants tracking system.
- NPS grants management and audit training is still needed.
- Continue work with ORD on rapid bioassessments.
- Continue working on support and appropriate linkages for mining and agriculture NPS issues.
- Continue work on a national strategy for integrating stormwater program with NPS.
- Develop better and more outreach materials for NPS.
- Consider holding joint meetings with States and Regions, similar to the Clean Lakes meeting, once every year or two.
- Continue to support Regional NPS contacts -- these contacts are very important to Regions.
- National monitoring program within NPS -- need to keep a close watch on success.
- Need to discuss with Regions the issue of federal consistency in the NPS program.
- Need to continue pushing clean sediment criteria.
- Gulf of Mexico Program needs points of contact if they are to be a national demonstration program

Monitoring

- Monitoring mission statement (including program guidance and interagency activities) is still very important.

- Continue work on standard 305b reporting by states.

- Continue work on training opportunities for STORET and other related programs. Concerns about 5-year schedule for modernization effort -- that states will develop own systems within that time.

- Continue work on TMDLs with OST and ORD, particularly TMDLs for NPS.

- Need to address recent issues to make waterbody tracking system operational.

- Continue to work with USGS on NAQWA, and continue to strengthen ties with EMAP.

- Stay on top of other related Agency initiatives, like OPPE Environmental Statistics group.

- Monitoring Branch is focused on improving relationships with ESDs -- don't forget about appropriate communications with Water -- need shared ESD/Water vision.

DIVISION AGENDAS: WETLANDS DIVISION

- Need immediate information on opportunities to work with Federal Highway Administration on new resources for wetlands mitigation.
- Need to build linkages with related agency initiatives on landscape approaches and the habitat cluster.
- Need to look for opportunities to build relationships with states and work on state capacity for the program.
- Continue work on mitigation banking.
- Continue outreach efforts to the farming community.
- Some progress on clearinghouse idea -- still need materials on wetlands values geared to a public audience.
- Still need enforcement training.
- Is anyone addressing seagrasses?

NATIONAL PRIORITIES

What two or three issues should OWOW be addressing that could have the most impact on continued environmental progress in your Region?

1. Demonstrate that OWOW is a credible force and can work as an organization -- effective use of some integrator like the Watershed Protection Approach.
2. Promote the WPA among AA's and other Agencies. Provide the flexibility and resources to make the program work.
3. Aggressive activity on the Clean Water Act reauthorization in conjunction with the Regions.
4. Revive the National Coastal and Marine Policy.
5. Continued promotion of volunteer monitoring programs and other public participation activities to develop local stewardship.
6. Support for agricultural pollution prevention work and technology transfer of NPS and 319 funded projects.
7. Identification and use of environmental indicators to measure program success. Completion of the monitoring mission statement.
8. Integrate the Wetlands programs within an overall landscape approach.
9. Develop technology to appropriately categorize wetlands -- other than on-the-ground surveys -- like remote sensing, NWI data base overlays.
10. Develop a policy framework for NPS.
11. Flexibility in addressing stormwater-related NPS issues.
12. Develop a greater awareness of state fiscal problems and build capacity.
13. Work on NPS mining, agricultural and hydromodification issues, coupled with an attention shift away from the coast.
14. Living resources protection through WQ standards.
15. Integration of coastal programs.
16. Define a uniform assessment and priority setting system across OWOW.
17. Get the Wetlands program out of politics.
18. Budget process improvements, $ out sooner and delegation of appropriate programs to the Regions.
19. Continuing support -- resources and other -- for NEP implementation.
20. Policy on disposal options for contaminated dredge material -- near shore versus offshore.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

OFFICE OF
WATER

MAR 26 1992

MEMORENDUM

SUBJECT: OWOW FY92 Regional Customer Survey

FROM: Louise P. Wise, Director
Office of Policy and Communication

TO: Addressees

As Bob indicated in his February 27, 1992 memorandum, we are conducting a followup customer survey to see whether our services to you have improved since June 1991 and to invite new suggestions for improvement. We will discuss the results with you during the OWOW National Program Meeting scheduled for May 5, 1992.

I have enclosed the new survey instrument as well as a copy of the results of the last survey for your review and reference. Ms. Ginger Webster, our consultant who conducted the last survey, will once again be conducting the telephone interviews. She will be calling to schedule an interview time with you between April 6 and 17, 1992.

We appreciate your time and cooperation in participating in the survey and look forward to a full and open exchange of the results in May.

Enclosures:

Survey instruments
Results of FY91 survey

Addressees:

Reg 1	Ron Manfredonia, Chief, Water Quality Branch Carol Wood, Chief, Monitoring/Environmental Study Branch
Reg 2	Mario Del Vicario, Chief, Marine and Wetland Protection Robert Vaughn, Chief, Water Standards and Planning Branch Richard Spear, Chief, Surveillance and Monitoring Branch
Reg 3	Jon Capacasa, Depute Director, Chesapeake Bay Program Richard Pepino, Chief, Environmental Assessment Branch, Victoria Binetti, Chief, Program Support Branch Joseph T. Piotrowski, Chief, Permits Enforcement Branch Robert Kramer, Chief, Environmental Monitoring Branch
Reg 4	Stallings Howell, Chief, Wetlands, Oceans and Watersheds Doug Lipka, Director, Gulf of Mexico Program Office
Reg 5	Ken Fenner, Chief, Water Quality Branch Jim Giattina, Deputy Director, GLNPO Valerie Jones, Chief, Monitoring and QA Branch
Reg 6	Norman Thomas, Chief, Federal Activities Branch, Richard Hoppers, Chief, Water Quality Management Branch Jim Steibing, Chief, Surveillance Branch
Reg 7	Kerry Herndon, Chief, Environmental Review Branch, Office for Policy and Management Larry Ferguson, Chief, Water Compliance Branch Thomas Hollowway, Chief, Enviro. Mon. and Surv. Branch
Reg 8	Dale Vodehnal, Chief, State Program Management Branch
Reg 9	Loretta Barsamian, Chief, Wetlands, Oceans and Esturaies Cat Kuhlman, Chief, Water Quality Branch
Reg 10	Ron Lee, Chief, Environmental Evaluation Branch Jack Gakstatter, Chief, Office of Coastal Waters Tom Wilson, Chief, Office of Water Planning Bienvenido Eusebio, Chief, Ambient Mon. and Analysis Br

OWOW CUSTOMER SURVEY

In preparation for the May Branch Chiefs meeting, OWOW is conducting a followup customer survey to determine our responsiveness to the concerns identified in the June 1991 survey, as well as identify new areas where improvements are needed. A copy of the results of the June 1991 survey is enclosed.

Interviewees should include Regional Branch Chiefs responsible for the wetlands, ocean and coastal, nonpoint source and water monitoring programs. Branch Chiefs can include other managers and staff in the interviews as appropriate.

I. Improving Services to the Regions:

a. Please rank from 5 (excellent) to 1 (poor) the following OWOW services in each major program area:

Budget planning and funding processes
Legislative strategies and Congressional liaison
National tools, such as policies, regulations and guidance
Enlisting assistance of other programs
Technology transfer and outreach
Overall administration, including administrative services, program priorities and working relationships

b. In your opinion, have OWOW services in each of these areas improved, declined or stayed about the same since the last survey?

c. Do you have any suggestions for improving OWOW support in any of these areas?

II. Improving Communications between OWOW and the Regions

a. Please review the suggestions made in the last survey on pages 17-19 of the summary report. Has OWOW been responsive to these suggestions?

b. Do you have any new suggestions that OWOW should consider?

III. Responsiveness to other Regional suggestions

Please review the suggestions and comments from pages 20-26 of the summary report? Are there suggestions or comments that you would like to re-emphasize?

IV. National Priorities

What two or three issues should OWOW be addressing that could have the most impact on continued enviromental progress in your Region? Please be fairly specific.

OWOW's TQM Plan

DRAFT

Objectives:

Through the use of the TQM philosophy and tools, OWOW is striving to:

- Better satisfy customer requirements (both internal and external)
- Increase the satisfaction, motivation, and skills of its workforce
- Increase the efficiency and effectiveness of its work processes

Plan:

1. Leadership and Commitment

The OWOW management team, led by the Director and Deputy Director, is committed to using TQM principles in every aspect of OWOW's work. To demonstrate its commitment, the management team (consisting of the Director, Deputy Director, Division and STaff Directors) will operate as a steering committee to guide and establish policy with respect to the application of TQM principles. The management team will regularly schedule time at team meetings to discuss TQM implementation issues, including the implementation of this plan.

The management team will also lead by example. To increase their ability to do this, OWOW managers will increase their knowledge of the TQM tools and principles until they become comfortable using them routinely in their work.

2. Infrastructure

OWOW's infrastructure for promoting quality principles consists of the following:

OWOW's Management Team (OD, DOD, DDs, and SDs) - is responsible for establishing Office-wide QATs, providing resources, and tracking implementation of OWOW's TQM plan.

OWOW's Quality Coordinator - is responsible for coordinating training, refresher and advanced seminars, user-group sessions, and communications.

OWOW's Quality Consultants - are responsible for advising OWOW members on the use of TQM tools and team leading.

3. Education

All OWOW managers have been trained in the EPA Executive Course. In addition, two members of OWOW have been trained as Team Leaders. Most OWOW staff received TQM training before the EPA Basic Course became available. OWOW is now planning three large training sessions to retrain staff who want it and to train those who have not yet received the training. For these trainings, OWOW will "benchmark" the TQM training model used by Xerox Corp. and will require that immediate supervisors of those staff being trained participate as co-facilitators in the training (along with an EPA-trained facilitator). This will serve the dual purposes of further familiarizing the supervisors with the tools and demonstrating their commitment to applying TQM principles.

After all staff have received this initial training, OWOW will concentrate its training efforts on Team Leader training for QAT team leaders and seminars and user-group sessions for those interested in more in depth training. OWOW will also identify and train a number of Quality Consultants to assist QATs.

4. Focus and Rollout of Improvement Efforts

OWOW's management team will oversee selection of "core" processes needing evaluation by dross-divisional QATs. To date the management team has established QATs to address training, rewards, distribution of funds to the Regions, and space. These QATs will be lead by Team Leaders and will be assisted by an OWOW Quality Consultant.

These office-wide improvement projects will be sponsored and monitored by OWOW's management team. Their progress will be tracked like any other work of the office: during quarterly office reviews, management retreats, and in OD/DOD briefings. Their selection will be based on information gathered in OWOW's customer and staff surveys, as well as preferences expressed by staff during

staff retreats. Systems for measuring the effectiveness of improvements made will be established.

In addition, each Division or branch will be encouraged to establish QATs for "work processes" within their control.

5. Information and Communication

OWOW's Quality Coordinator will take responsbility for communicating information about OWOW's TQM-related activities to OWOW staff. The coordinator will be responsible for establishing seminar and user-group sessions on TQM. In addition, OWOW will use its OWOW Highlights to regularly report information on implementation of TQM principles to its internal and external customers.

6. Measurement

Borrowing from Federal Express's system for measuring the health of its "people, service, and profits," OWOW is undertaking three areas for measurement and continuous improvement: (1) its employee satisfaction; (2) its customer satisfaction; and (3) its program results.

With respect to OWOW's employees, OWOW has and will continue to conduct an annual survey (around January) to gage satisfaction and identify areas for improvement. With respect to customers, OWOW has (for two years) and will continue to conduct an annual Regional customer survey (in April) and to discuss the results at its annual National Program meeting (in May). With respect to program results, OWOW will use strategic planning to establish goals, determine action plans, and identify measures of progress toward those goals. OWOW will strive to have these measures in place by FY93.

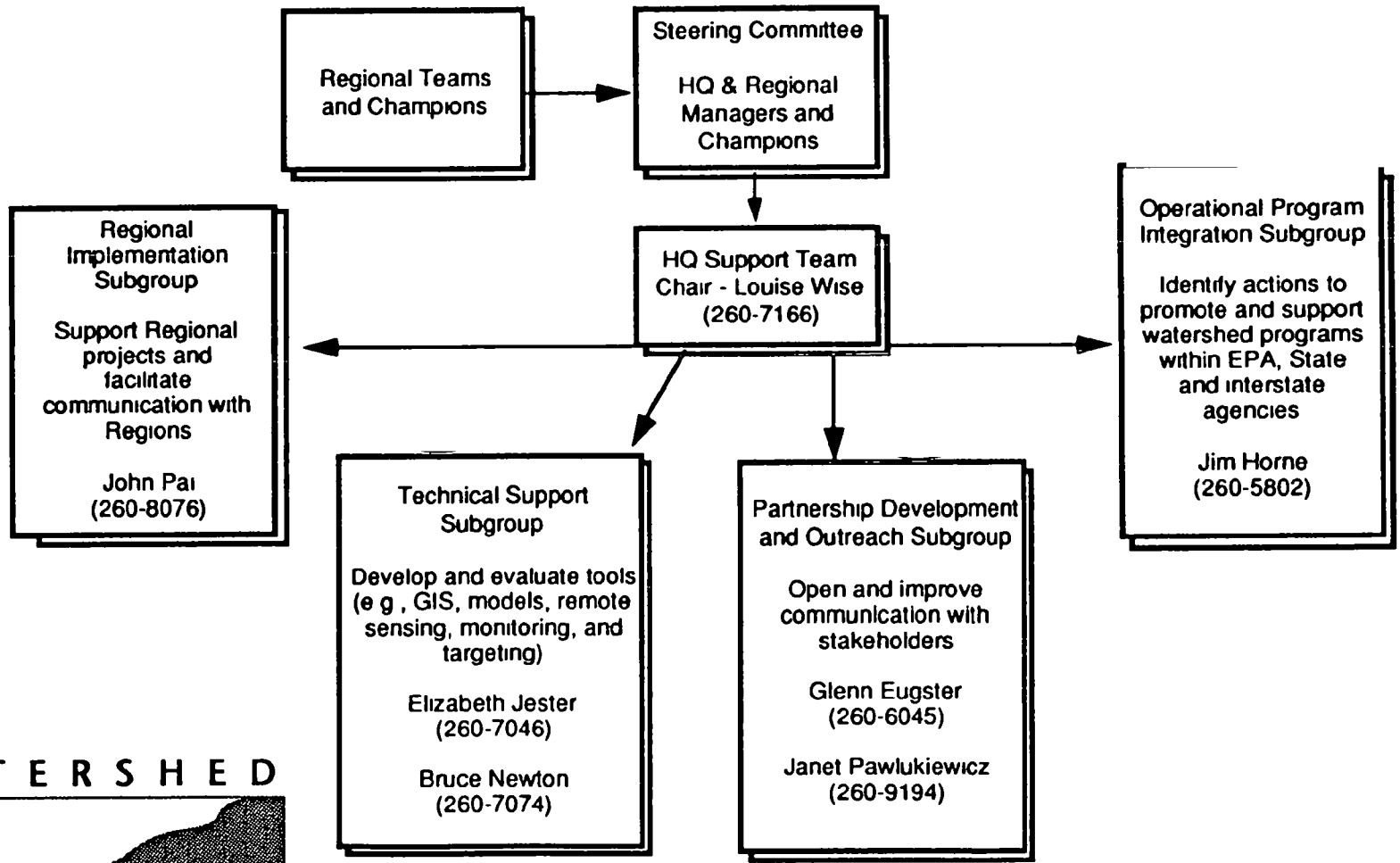
7. Systems Alignment

OWOW has identified the following systems for alignment with TQM principles: OWOW's strategic planning, in-house and Regional measurement and accountability systems, and human resource systems (such as rewards, promotions, performance reviews, and training). All of these systems are being reviewed by Agency-wide groups (e.g. Budget Reform Task Force and the Human Resource Systems Alignment QATs). While keeping informed of these agency-

wide efforts, OWOW will proceed to incorporate quality principles into those systems within OWOW's control.

4

Headquarters Support



WATERSHED PROTECTION

• An Integrated, Holistic Approach •

WATERSHED PROTECTION

• An Integrated, Holistic Approach •

Office of Water

U.S. Environmental Protection Agency

What is a Watershed?

A watershed is a geographic area within which water drains to the same central point, such as a stream, river, or lake.

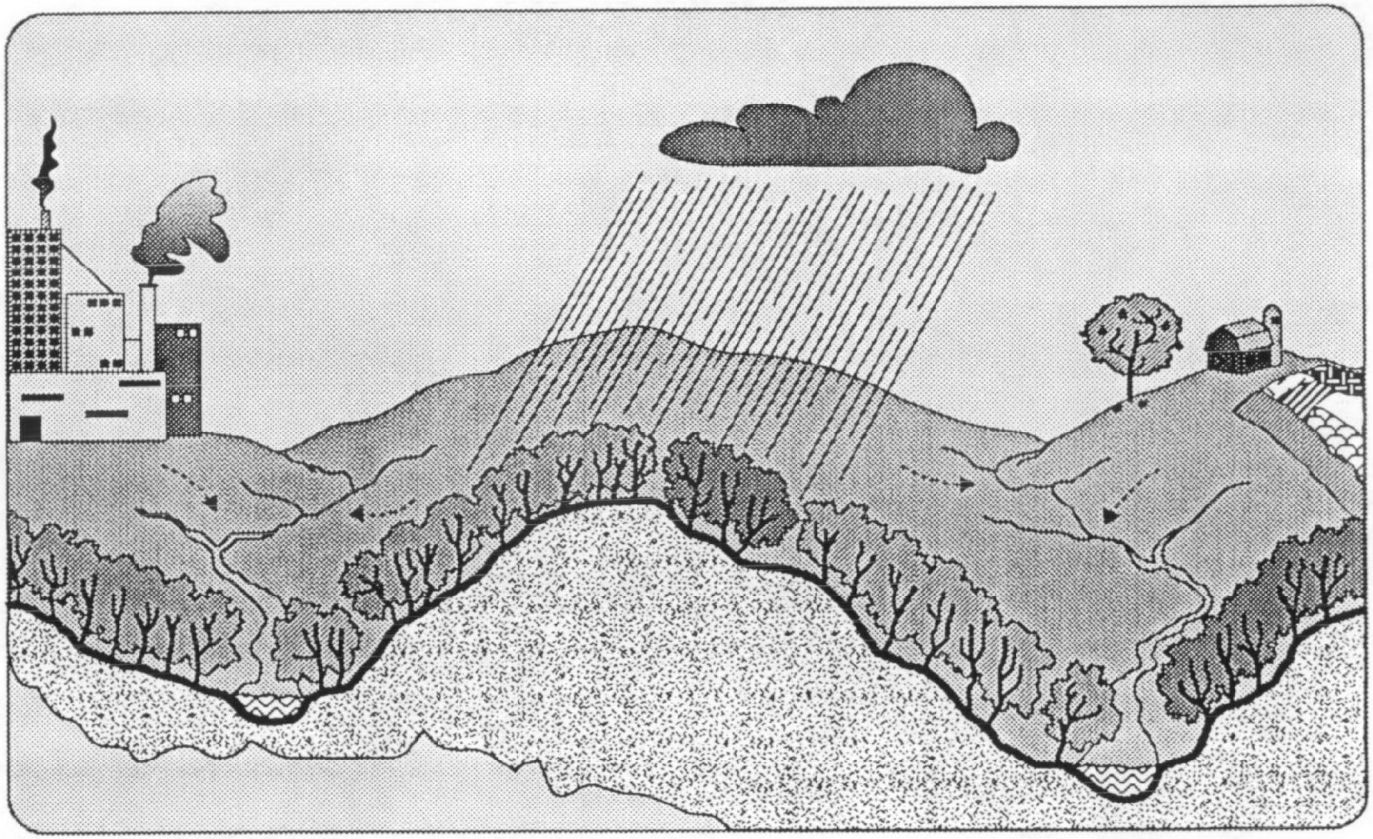
Key characteristics include:

- Form of landscape
- Rocks
- Soils
- Ground water and surface water
- Climate and precipitation
- Land use and land cover
- Human population

WATERSHED PROTECTION

• An Integrated, Holistic Approach •

What is a Watershed?



WATERSHED PROTECTION

• An Integrated, Holistic Approach •

What are the Problems in Watersheds?

- Sources of environmental stress include:
  - Habitat destruction
  - Hydrologic alterations
  - Point source pollution
  - Nonpoint source pollutants
  - Groundwater contamination
  - Waste dumping

WATERSHED PROTECTION

• An Integrated, Holistic Approach •

What is the Goal of the Watershed Protection Approach?

- To maintain and improve the health and integrity of aquatic ecosystems using comprehensive approaches.

WATERSHED PROTECTION

• An Integrated, Holistic Approach •

Key Elements of the Watershed Protection Approach

Problem Identification

Identify the primary threats to human and ecosystem health within the watershed.

Players

Involve the people most likely to be concerned or most able to take action.

Integrated Actions

Once solutions are determined, the players take corrective actions in a comprehensive, integrated manner.

WATERSHED PROTECTION

• An Integrated, Holistic Approach •

What are EPA's Goals?

- Work in selected areas to demonstrate watershed protection approach
- Integrate Federal and State programs to support watershed protection
- Promote a broad understanding of the approach
- Provide tools and measure success

WATERSHED PROTECTION

• An Integrated, Holistic Approach •

Relationship to Existing Environmental Programs

- Not a new program, but an effort to align, coordinate, and build upon existing programs
- Funded through a variety of programs
- Complements other targeting programs

WATERSHED PROTECTION

• An Integrated, Holistic Approach •

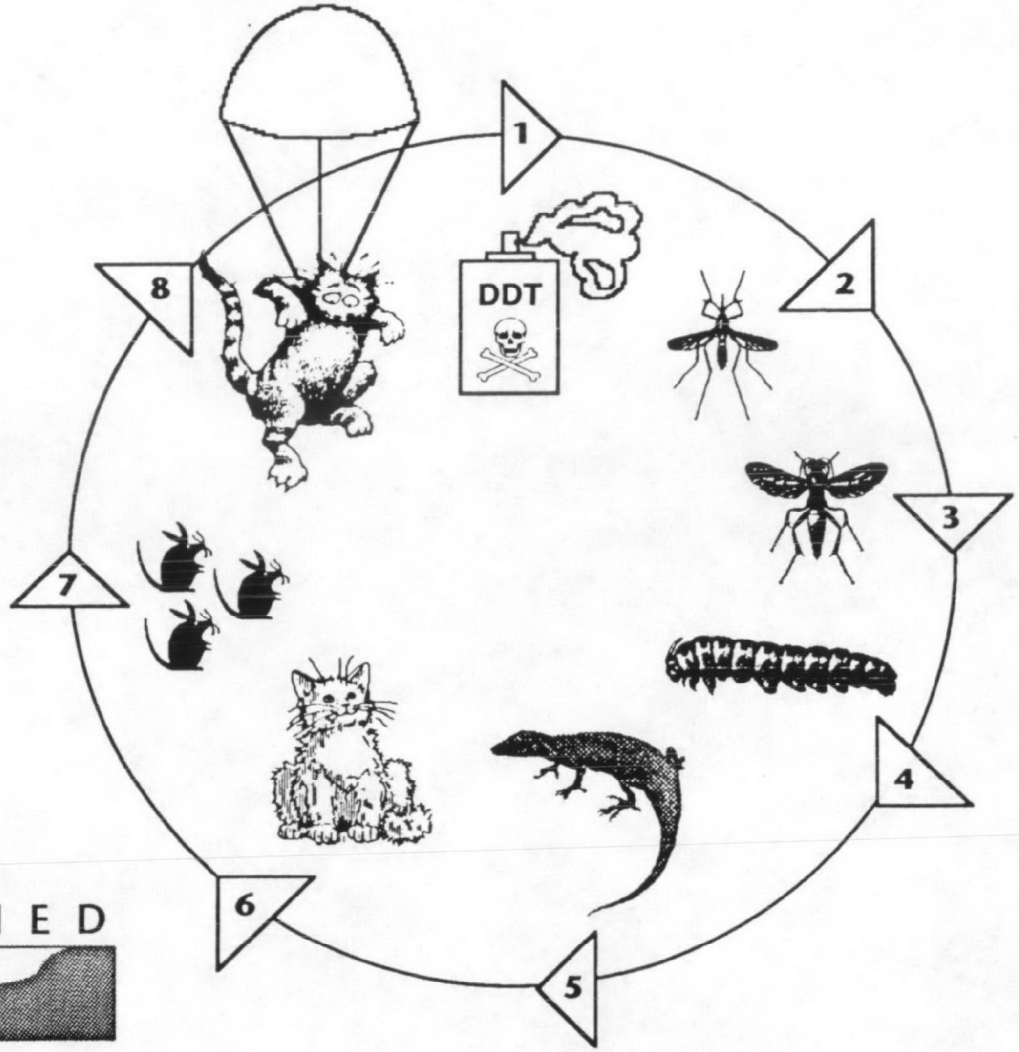
EPA Steps to Date

- Established organization for watershed protection
- Issued Watershed Protection Approach Framework Document
- Regions selected initial watershed projects
- Working to align and coordinate Federal programs

WATERSHED PROTECTION

• An Integrated, Holistic Approach •

A System Gone Awry



WATERSHED PROTECTION

• An Integrated, Holistic Approach •

4/14/92

THE WATERSHED PROTECTION APPROACH (WPA)

Headquarters Organization
January - December '92

Headquarters Support Team
Chair: Louise Wise, OWOW (260-7166)
Members: Representatives of all OW offices

Base Program Integration Subgroup

Purpose:
To identify actions to be taken to promote and support watershed programs within EPA, State, and interstate agencies

Chair: Jim Horne, OWEC (260-5802)
Members: Louise Wise, OWOW
Sandy Germann, OWOW
Mark Curran, OWOW
Rob Wood, OWEC
Jim Taft, OWEC
Don Brady, OWOW
Bill Painter, OPPE
Diane Davis, OW

Partnership Development and Outreach Subgroup

Purpose:
To open, improve, and maintain communication with potential stakeholders, including other federal agencies, state and local governments, and nongovernmental organizations.

Co-Chairs: Glenn Eugster, OWOW (260-6045)
Janet Pawlukiewicz, OWOW (260-9194)
Members: Mary Blakeslee, OST
Jan Gallagher, OGWDW
Sandy Germann, OWOW
Diane Davis, OW
Hal Wise, OWOW

Regional Implementation Subgroup

Purpose:
To maintain communication with Regional champions, to support development of Regional frameworks and projects; to analyze individual projects in terms of what actions HQ needs to take to support projects.

Chair: John Pai, OWOW (260-8076)
Members: Don Brady, OWOW
Rob Wood, OWEC
Carl Reeverts, OGWDW

Technical Support Subgroup

Purpose:
To develop tools and provide training and support on existing tools to Regions, States, and other interested organizations

Co-Chairs: Bruce Newton, OWOW (260-7074)
Elizabeth Jester, OWOW (260-7074)
Members: Bob King, OWOW
Russ Kinerson, OST,
Amy Sosin, OWOW
Clive Davis, OGWDW

PROPOSED ACTION PLAN ITEMS

HQ Support Team

HQ Support Team Meetings--group meets monthly (Mondays, 11:15-12:45) to coordinate WPA activities, address any outstanding issues, and brainstorm

Long-Term Strategic Plan--to begin planning FY93-95 activities, including coordinated budget and program planning; focus on institutional changes in States and other agencies; tech transfer; and technical guidance

Annual Report--summary of steps taken over FY 91-92 in EPA HQ and Regions to promote and support watershed approaches; analysis of lessons learned.
John Pai, OWOW
Draft October 92
20K (OWOW/PCS)

Operational Program Support Group

Watershed Project Support--select a few projects from States or Regions that cut across OW/EPA programs and identify specific actions and institutional changes required to break down barriers and support watershed approach.
Mark Curran, OWOW
December 92
10K (OWOW/OCPD)

ASIWPCA and AMSA--promote approach with the states and municipalities, breakdown barriers and document examples of state basin-wide approaches
Jim Horne, OWEC and Louise Wise, OWOW
92-93 project
40K in FY92 (20K each from OWOW/PCS and OWEC)

Federal Agency Workgroup--interagency workgroup established to share information on watershed approaches and consider recommendations for CWA reauthorization
Sandy Germann, OWOW
Recommendations by September 92
No AC&C

Wetlands staff also will discuss WPA at joint training with USDOT in April and May, USCOE in June
Glenn Eugster, OWOW
No AC&C

Training Module--workshop to develop skills in carrying out watershed protection projects, possibly to include targeting methods, constituent and consensus building, sources of funding
Sandy Germann, OWOW
Pilot FY92
20K (OWOW/OCPD)

Partnership Development and Outreach Subgroup

Constituent meetings --arrange for Bob Wayland and Dave Davis to meet informally with representatives from associations of state and local programs, environmental groups, and affected parties to discuss philosophy of watershed approach, pros and cons, special needs, and interests
Janet Pawlukiewicz, OWOW
Quarterly-- November, February, June, September
No AC&C

Slide show--overheads, 35mm color slides, and text for presentation of concept to constituent groups and other interested parties
Janet Pawlukiewicz, OWOW
Overheads/Slides--April; Script--Mid-May
5K (OWOW/PCS)

Newsletter--insert in *News Notes* to inform Regions, States and others of watershed activities; includes "success and failure stories"
Janet Pawlukiewicz, OWOW
Quarterly (Mar, June, Sep, Dec)
No AC&C

WPA Conference--Plan EPA-sponsored national conference to promote the watershed approach and evaluate progress to date; to document successful approaches and projects; and to help develop technical and programmatic tools for implementation of watershed projects
Janet Pawlukiewicz, OWOW
(December 92 or January 93)
$30K (OWOW/PCS)

Conference Sessions, Exhibits, and Brochure Distribution
see attached preliminary list

Geography Awareness Week--EPA and National Geographic Society
The project is a 2-tiered training and education project based upon existing state geography alliances previously established by NGS.

1) Summer 92--workshop aimed at increasing primary and secondary school educators' knowledge of water resource issues and establishing partnerships between educators and water managers. Workshop particpants will enhance packet developed jointly by EPA and NGS. Educators are committed to providing training to their colleagues within the states.

2) November 15-21 '92--Geography Awareness Week
Theme: Geography: Reflections on Water
Classroom activity packets distributed to 150,000 educators, nationwide.
Janet Pawlukiewicz, OWOW
No AC&C

Watershed Users Group on Bulletin Board System (BBS)
Ongoing starting April
Hal Wise, OWOW
30K (OWOW/AWPD)

$25 GIS of Watershed Projects
map EPA watershed projects
Janet Pawlukiewicz, OWOW
May 92
No AC&C

Inventory of Watershed Projects
Establish criteria for watershed projects to be included in database, prepare data collection form, collect information through *News Notes* and Bulletin Board System, and compile database. Include geographic descriptors for eventual incorporation in GIS.
Data collection Summer 92; database Nov 92
Hal Wise, OWOW
20K (OWOW/AWPD)

Articles in Newsletters
News Notes--Feb 92
Coastlines--Feb 92
Pollution Prevention
Insight EPA
Anne Robertson, OWOW
No AC&C

Regional Implementation Support Group

Quarterly videoconference calls with Regional contacts
John Pai, OWOW
Feb, May, Aug, Nov
No AC&C

FY92 Regional Project Analysis--detailed information on 2 or 3 Regional watershed projects selected for initiation/implementation in FY92 to be used to analyze what specific actions might be taken to support regional projects (see Watershed Project Support under Operational Program Integration Subgroup)
John Pai, OWOW
August 92
No AC&C

Regional Frameworks--support development of 2-3 Regional frameworks for watershed protection
John Pai, OWOW
Region 8--1st draft August 92--$25K (OWOW/PCS)
Region 3--to be scheduled--$25K reserved (OWOW/PCS)

Regional Reviews--obtain updates on WPA during OWOW Regional reviews
OWOW staff
No AC&C

Technical Support Subgroup

Targeting Handbook--a document describing the value of targeting, technical approaches for large-scale assessment of conditions and selection of priority watersheds, and potential programmatic application. The handbook may also include risk-based approaches, data sources, use of GIS, case studies, etc. Policy directions related to 303(d), 319 and other base program obligations will be addressed in a concurrently-issued memorandum.
Peggy Michell, OWOW
Draft April 92; Final June 92

Watershed Handbook--overview of steps in watershed planning, discussion of technical and institutional approaches, annotated bibliography, sources of data.
Amy Sosin, OWOW
Draft July 31, '92, Final November 92

50K (OWOW/AWPD)

Compilation of GIS Case Studies–Directory with short cases studies on EPA, state, and possibly local applications of GIS.
Bob King, OWOW (may be done through the Regioal GIS workgroup chaired by Ben Eusubio with assistance by Mason Hewitt, Las Vegas)
Draft June 92; Final August 92
No AC&C

Environmental Indicators for WPA Projects–Guidance on environmental indicators to measure trends and programmatic success for watershed projects
Elizabeth Jester, OWOW
Draft October 92; Final December 92
No AC&C

State Program Implementation Cost Efficiency Study--Study on the cost implications and potential improvement in efficiency associated with shifting water quality program implementation to a basin approach
Don Brady, OWOW
Draft ; Final
60K (OWOW/PCS)

OTHER IDEAS
1. Inventory State approval criteria and implementation techniques under the Surface Water Filtration Rule
OGWDW

2. Write up NEP Demonstration Projects as case studies for WPA
OWOW

3. Directory of Expertise and Information Sources
Try to find a PMI to assemble a directory of who to call for information concerning significant problems in other agencies, national experts on various topics, contacts for sources of data
John Pai, OWOW
Contingent on finding a PMI

Conference Sessions, Exhibits, and Brochure Distribution

Conference Sessions

Coastal Society, April 7, DC
Private Landowners Workshop (WSSP/WD/OWOW), Fall
National Congress of American Indian, Diane Davis, DC, Dec 1-6

Exhibit at Conferences

Tribal Management Conference, May 19-22
UNCED–Brazil, June
Audubon, June ?, DC
? ECO World, June 14-17, DC
Water Environment Federation, LA Sep 20-24

Brochures at Conferences

AWPD		Enhancement of State Lake Management, IL May 6-9
Shaw	200	Water Quality International, May 24-30 DC
Shaw	1000	American Water Works Association, Canada, June 18-24
Shaw	2000	National Education Assoc, DC July 4
Shaw	500	National Assoc. of Counties, MN July 9-11
who	200	National Env. Health Assoc., Winnipeg July 12-17
Shaw	200	National Conference of State Legislatures, OH July 26-31
Shaw	100	National Assoc. of Towns and Townships, DC Sep 4-6
Shaw	200	International City Managers, NV Sep 13-18
Shaw	200	Env. Protection Information Conference, DC Oct 20-23
Shaw	500	Natl Rural Water Assoc., KY Oct 26-28
Shaw	200	American Public Health Assoc., DC Nov 8-12
WD		Private Landowners Workshop , Fall

Brochure available through Wetlands Hotline

Water Quality 2000

A cooperative effort to improve the nation's water quality program

MEMORANDUM

April 23, 1992

TO: Water Quality 2000 Member Organizations

FR: Tim Williams, Project Director Tim Williams

RE: Phase III Report - Ratification

I am pleased to transmit the final draft of the Water Quality 2000 Phase III Report. This report is being sent to all voting Member Organizations for ratification. Eight-five percent of the voting Member Organizations must approve the report before it can be adopted. The deadline for responding is July 23, 1992.

The final draft report includes changes made by the Steering Committee after the February 13-14 Member Congress. As you will recall, over 70 amendments to the January draft report were submitted at the Member Congress. Some were acted on, but most were referred to the Steering Committee. The Steering Committee met on February 20, March 5-6, March 30, and April 10 to address these amendments. Each issue was discussed and acted upon in a consensus fashion, and no votes were required.

The report reflects a strong sentiment among an extremely diverse group of interests about the need for new directions in U.S. policies and programs to protect surface and ground water resources. The Steering Committee believes the report will make a positive contribution to the national water policy debate and provide a good basis for implementation and outreach efforts in Phase IV of our project.

We need your help in two specific areas:

1. Ensure that the report receives timely consideration within your organization.

The Steering Committee established a 90-day ratification period based on the results of a survey sent to all Member Organizations. The vast majority of organizations responding reported that they could act on the report within this time period. A few organizations said they would need longer, in each case based on a specific board or committee meeting date. At the Steering Committee's request, I will contact these

Address Correspondence to: 601 Wythe Street, Alexandria, Virginia 22314 • (703) 684-2418 • FAX: (703) 684-2492

organizations in the next two weeks to explore the possibility of an alternative approval process that will allow them to meet the July 23 deadline.

In determining your organization's response, we suggest the same criteria used to define consensus on the Phase II Report: Although each and every statement in the report may not be completely in concert with each organization's perspective, the organizations agree that, taken as a whole, the report constitutes a representative and balanced approach that will lead to improved water quality and is consistent with the Water Quality 2000 Vision and Goal.

The Water Quality 2000 Articles of Agreement allow for minority reports signed by two or more voting Member Organizations to be printed along with the final report. The Steering Committee has approved guidelines for submitting and accepting minority reports (see attached). It is the Steering Committee's hope that the amended report can be ratified without the need for any minority reports.

2. Tell us what your organization can do to help publicize and implement the recommendations in the report.

In addition to ratifying the report, we are asking that each Member Organization commit to at least one program or activity to help publicize and implement the recommendations. This could include a conference session or speaker, coverage in your publications, or some other activity focused on the overall report or a particular subset of recommendations.

We are planning a meeting for mid-June to focus specifically on implementation activities. If your organization would like to be involved in this meeting, give me call.

I am available to answer any questions you may have about the report, changes made since the January draft, and potential implementation activities. In addition, I will be happy assist in any other way I can, including meeting with you or your organization to discuss the report or our future plans.--I can be reached at (703) 684-2437 or (703) 684-2418. Thank you for your continued support of Water Quality 2000.

P.S. -- We are also continuing our fund raising efforts, including seeking funds to print and distributing the ratified report. Any suggestions in this regard would be most welcome.

April 23, 1992

FACT SHEET

Water Quality 2000 Phase III Report
Recommendations for Improvement

The Water Quality 2000 Phase III Report presents consensus recommendations for improving U.S. surface and ground water resource protection efforts. These recommendations support Water Quality 2000's vision and goal, adopted in May 1989:

VISION: **Society living in harmony with healthy natural systems.**

GOAL: **Develop and implement an integrated policy for the nation to protect and enhance water quality that supports society living in harmony with healthy natural systems.**

The report was developed through an iterative, work group process that included over 100 individuals representing the seven Water Quality 2000 membership sectors (academia, professional/technical societies, private sector interests, public interest/conservation groups, and federal, state, and ~~local~~ government). Five Challenge Groups met approximately five times each between March and August 1991 to identify potential solutions to problems identified in an Interim (Phase II) Report. A Member Congress held in June 1991 gave other representatives an opportunity to review draft solutions and allowed for coordination between the five groups.

In August 1991, a Steering Committee began the task of integrating over 100 "solution statements" developed by the Challenge Groups into a single report. This 20-member committee met five times through January 1992 to produce a draft report for review by the Member Organizations. A second Member Congress was held in mid-February 1992. At this meeting over 70 amendments to the draft report were proposed. The Steering Committee subsequently held four additional meetings to address these amendments and complete the report.

Eighty-five percent of the voting Member Organizations must ratify the report before it can be adopted. A 90-day ratification period has been established. Minority reports submitted within the ratification period and signed by two or more voting members will be published along with the report. The Steering Committee reserves the right to request changes in the format or length of minority reports and to decline to accept any that are not germane to the Phase III Report.

Chapter-by-Chapter Review of the Phase III Report

Executive Summary

The Executive Summary provides an overview of the report's major conclusions and recommendations. The summary may be distributed as a "stand-alone" document as well as being included with the full report.

Chapter I - Causes of Water Quality Problems and Impediments to Solutions

This chapter summarizes the findings of the Interim (Phase II) Report as a preface to the recommendations presented in chapters II, III, and IV.

Chapter II - National Water Resources Policy - A First Step

This chapter presents Water Quality 2000's major recommendation: An integrated national policy to protect of surface and ground water resources that incorporates three overall strategies:

- Preventing pollution and water resources degradation;
- Increased individual and collective responsibility for water resource protection; and
- Planning and managing water quality and quantity on a watershed basis.

Specific recommendations are included under each of these three strategies. In the pollution prevention section, needed actions in the industrial, agricultural, energy, transportation, land development, and household sectors are discussed.

Chapter III - Getting from Problems to Solutions - The Tools of Change

This chapter presents 85 detailed recommendations, organized under eight headings: education and training; pollution prevention; wise resource use; managing growth and development; increased scientific knowledge and improved technologies; eliminating gaps, overlaps, and conflicts in regulations and legislation; strengthening existing federal programs; and providing incentives and financing for water quality improvements.

An explanation of issues either not addressed or not agreed by Phase III participants appears at the beginning of Chapter IV. Some recommendations appearing in Chapter III also appear in Chapter II. The Steering Committee decided to include them in both places for emphasis.

Chapter IV - A Management Approach for Solving Water Quality Problems

This chapter discusses the roles of various actors - including federal, state, regional, and local governments, in implementing an integrated water quality policy. A series of specific recommendations for enhanced federal government leadership and improved coordination between federal agencies are presented.

Chapter V - Next Steps - Implementing A New National Water Resources Policy

This chapter presents a call to action. It reviews the major themes of Phases II and III, calls for implementation of the Phase III recommendations, and commits the ratifying organizations to this goal.

Appendices

The printed final report will include several appendices and not attached to the current draft. These include: an explanation of the governance and structure of Water Quality 2000 (cited as Appendix A in the current draft); a list of Member Organizations; a listing of Phase III Challenge Group and Member Congress participants; a list of Steering Committee members and their affiliations; and a list of financial contributors.

Water Quality 2000

Minority Report Guidelines

Status: Approved by Water Quality 2000 Steering Committee, November 3, 1991

Section XV of the Water ~~Quality 2000 Ar~~ticles of Agre~~ement~~ states that "minority reports adopted by two or more of the members of the Congress will be printed along with the final report."

In order to implement this provision, the Steering Committee has adopted the following guidelines:

1) All minority reports must be germane to Water Quality 2000 and the Phase III Report.

2) Minority reports should be as specific as possible in relating dissenting comments to a particular section of the Phase III Report.

3) Minority reports should be as brief as possible, preferably one single-spaced typed page or less.

4) Minority reports must include the names and signatures of representatives from at least two voting Member Organizations.

5) Minority reports must be submitted within the deadline established by the Steering Committee. (July 23, 1992)

6) If a report is submitted within the established deadline but does not conform to items 1 through 4 above, the Steering Committee will return the report to the originating organizations to be revised and resubmitted.

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3/24/92

Water Quality 2000

Phase III Report

RECOMMENDATIONS FOR IMPROVEMENT

April 1992

This draft is now being reviewed by the Water Quality 2000 members, and has not been officially ratified.

DRAFT

Table of Contents

Executive Summary

Water Quality 2000 is a cooperative effort of more than 80 public, private, and nonprofit organizations. In 1988, we began a four-phase effort to develop an integrated national policy for U.S. water quality and surface and ground water resource protection. This policy supports Water Quality 2000's vision -- a society living in harmony with healthy natural systems. Our Interim Report, published in June 1991, identified problems with current water quality policies and programs. This report builds on that foundation to present consensus recommendations for improvement, as developed by over 125 individuals serving on five working groups and a Steering Committee. During the next phase of our work, Water Quality 2000 and the participating organizations will transmit these recommendations to Congress, the Executive Branch, state and local governments, business and professional leaders, and others whose actions influence water quality. A complete description of the process by which Water Quality 2000 is organized and governed is included in Appendix A.

THE CONDITION OF THE NATION'S WATERS AND AQUATIC HABITAT

The Interim Report concluded that progress has been made in improving the condition of the nation's waters over the past 20 years, but, nonetheless, the national goal of "fishable and swimmable" waters has not been attained in many areas. Moreover, much work remains to achieve the broader, overall objectives of a wide range of water legislation, including the broad objective of the Clean Water Act -- to restore and maintain the chemical, physical, and biological integrity of the nation's waters.

Conclusions about the condition of the nation's waters are complicated by the fact that data on water quality and the health of ecosystems are incomplete. Data on the release of contaminants is incomplete, covering only a fraction of all waters and typically, a small number of pollutants. The lack of such basic information leads to conflicting assessments of our progress. Evidence indicates that progress is being made. Nonetheless, reports demonstrate that surface waters are contaminated by siltation, nutrients, organic matter, and hazardous materials*; groundwater contamination results from animal wastes, fertilizers, pesticides, and other agricultural sources, from industrial sources such as manufacturing processes, leaking underground storage tanks, and spills, and from interaction with contaminated surface waters; and wetlands and riparian areas continue to be destroyed or degraded by a wide variety of human activities. Some aquatic ecosystems are also stressed by changes in physical habitat, altered flows and water tables, overharvesting, and introduced species.

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*The word "hazardous," when used in this report, is not intended to refer to any specific statutory definition but instead is used broadly to mean any materials that, when released, are harmful to public health or the aquatic environment.

CAUSES OF WATER QUALITY PROBLEMS

The fundamental causes of current water quality problems lie in seemingly unrelated aspects of life: the way we farm, produce, consume, transport people and goods, and plan for the future. Many aspects of modern life and our past practices put pressure on water quality. Until recently, these activities proceeded with little recognition of the degradation they caused to surface waters, groundwater, and aquatic habitat. When the conflicts between these activities and water quality were recognized, they were resolved through relatively narrow efforts focusing on the direct sources of impairment but not necessarily the root causes of the problem. Water Quality 2000's vision will be achieved only if we reshape societal functions in ways that are compatible with protecting water resources.

Sources that contribute to current water quality impairment include (in alphabetical order):

- agricultural activities;
- community wastewater discharges;
- deposition of atmospheric contaminants;
- industrial activities, including the manufacturing, service, power generating, and waste management sectors;
- land alteration, including logging, mining, road building, and commercial and residential development;
- stocking and harvest of aquatic species;
- transportation activities, including shipping, surface transportation, automobiles, pipelines, dredging, and facilities construction and operation;
- urban runoff, including municipal and industrial stormwater; and
- water projects, including dams, reservoirs, and channelization.

IMPEDIMENTS TO SOLUTIONS

In addition to societal factors, the Interim Report identifies seven impediments to further improvements in water quality caused by shortcomings in current water quality policies and programs. In the near-term, opportunities exist to improve water quality by addressing these seven impediments:

- *Narrowly focused water policies* impede holistic solutions that address cross-media effects, the connection between groundwater and surface water and between water quantity and water quality;

- *Conflicts among water quality institutions* impede collaboration between all levels of government, the private sector, and individuals;

- *Legislative and regulatory overlaps, conflicts, and gaps* create inefficient or ineffective solutions or leave water resources underprotected;

- ***Funding and incentives for clean water*** programs are out of touch with public opinion and actual need;

- ***Inadequate attention to the need for trained personnel*** has resulted in a serious gap between a limited supply of trained professionals and a growing demand for their skills;

- ***Research and development programs are insufficient to meet the challenge*** posed by the complexity of today's water quality problems and the need to improve basic scientific understanding; and

- ***Inadequate communication*** has resulted in a public that is largely unaware of the linkages between daily life and water resources, what they can do to improve water quality, and why they should care in the first place.

GETTING FROM PROBLEMS TO SOLUTIONS

Public and private efforts to protect water resources have produced some successes, but there is significant room for improvement. Some problems have been solved, others await the results of programs only recently put in place, and others remain challenges for the future. Water Quality 2000 identified 12 such challenges for further consideration in Phase III:

- Preventing pollution,
- Controlling runoff from urban and rural lands,
- Focusing on toxic constituents,
- Protecting aquatic ecosystems,
- Coping with multi-media pollution
- Protecting groundwater,
- Increasing scientific understanding of water quality issues,
- Promoting wise use of resources,
- Setting priorities,
- Providing safe drinking water,
- Managing growth and development, and
- Financing water resource improvements.

Our development of recommendations for improvement was organized around these 12 challenges. Five "challenge groups" were formed to address specific concerns identified in the Interim Report against a backdrop of Water Quality 2000's Vision and Goal adopted in May 1989. The recommendations developed by these groups included many of the traditional tools for change -- education, incentives, regulations, training, and research. But there were also several themes common to the work of all five groups that form the basis of an integrated strategy for protecting surface and ground water resources.

National Water Resources Policy – A First Step

The United States has no unified national policy that observes the principles of integrated land and water resource planning and management. Instead, our water policies comprise a patchwork of narrow, often conflicting objectives; jurisdictional conflicts mark both the legislative and executive branches of the federal and some state governments; sound economic principles are often missing from resource allocation decisions; and many sources of water quality impairment remain unaddressed or underaddressed.

Water Quality 2000 concludes that a new national water policy is needed to integrate planning and management to protect surface and ground water resources with related societal activities under a watershed framework. This policy and a national strategy to protect water resources must be based on the principles of pollution prevention and resource conservation and must be designed to incorporate concern for water resources into every aspect of human activity. We must strive to integrate institutions, ecology, economics, and where appropriate, technology. We envision three strategies comprising our policy framework:

- Protecting water resources by preventing pollution;
- empowering all segments of society to contribute to water resource improvements through increased individual and collective responsibility; and
- planning and managing water quality and quantity on a watershed basis.

In short, an integrated, national policy that supports society living in harmony with healthy natural systems.

Preventing Pollution and Water Resource Degradation

Avoiding the degradation of natural systems is preferable, on ecological and economic grounds, to mitigating damages after they have occurred. Generally associated with the industrial sector, pollution prevention is equally applicable and useful as a guiding principle for other sectors or sources of impairment. Water Quality 2000, therefore, recommends the following:

Nonpoint Sources (Runoff and Leachate)

> *Congress should fully fund a strengthened and expanded national nonpoint source (runoff and leachate) pollution prevention program under Section 319 of the Clean Water Act that encompasses all sources of runoff and leachate including agriculture, land development, transportation, and forestry. Program components should include (1) EPA-approved, enforceable state programs to be implemented in conjunction with regional watershed authorities; (2) a combination of voluntary and mandatory targeted pollution prevention plans for individual land users, such as farmers; (3) technical assistance programs administered by USDA for the*

farm sector and other agencies as appropriate for the other sectors; and (4) new federal/state revolving loan programs to help finance improvements on individual tracts of land, such as farms or forest tracts.

Energy and Transportation

Water Quality 2000's recommendations to promote pollution prevention in the energy and transportation sectors include: (1) enactment of a federal production tax credit for renewable energy supplies; (2) building and equipment energy-efficiency standards; (3) incentives to stimulate the use of mass transit in high-density urban areas; and (4) improved transportation fuel efficiency.

Industry

To promote additional progress in pollution prevention for the industrial sector, Water Quality 2000 recommends (1) increased incentives for industry to implement pollution prevention; (2) the development of facility-level pollution prevention plans; (3) voluntary steps by industry to review and modify internal processes or end products; (4) government control of product uses in appropriate situations; and (5) a national effort to develop and refine life cycle assessment analyses as a tool for identifying opportunities for improved pollution prevention.

Households

A series of actions are recommended to reduce pollution from the household sector: (1) industry should adopt product labelling practices that indicate materials and energy efficiency associated with consumer products; (2) local governments should undertake programs to make household pollution prevention easier; and (3) Congress and state and local legislatures should offer financial incentives to encourage individual actions to reduce pollution.

The Pollution Prevention Act of 1990 provided a much needed first step toward institutionalizing pollution prevention for all sources by declaring that pollution prevention was a "national objective." It will be critical for EPA and others to implement programs under this Act in full recognition of the need for broad application of pollution prevention principles to all media, all sources of adverse environmental effects, and all sectors of the U.S. economy.

Individual and Collective Responsibility for Water Resources

Water Quality 2000's Vision and Goal can only be realized if the American people as individuals and collectively as members of the community adopt a heightened sense of responsibility for protecting water resources.

Although much can be accomplished through leadership and education, experience has shown that purely voluntary behavior will not always change behavior sufficiently. Some people will change their actions for altruistic reasons; others will require some incentive to do so. And, invariably, some people and businesses will require more than incentives and education to take responsible actions. The following actions will help ensure individual and collective responsibility for protecting water resources:

> ***Education*** *-- all levels of government, the media, trade, and professional societies and academic institutions can help to educate individuals and businesses about how their actions may degrade water resources and what actions can be taken to reduce or eliminate those impacts.*
>
> ***Incentives and financial assistance*** *-- Often individuals and businesses want to make changes to protect water resources but lack the financial resources to do so.*
>
> ***Facilitation*** *-- Government must make responsible behavior easier by, for example, working with the private sector to provide for collection, recycling, and proper disposal facilities for small quantities of hazardous waste.*
>
> ***Regulation*** *-- Regulation of some activities is a necessary part of governmental efforts to protect water quality and aquatic resources.*

A Watershed Basis for Watershed Planning and Management

Most natural events and economic activities affect the quality of water resources principally within watershed boundaries. As a result, watersheds constitute the most sensible hydrologic unit within which actions should be taken to restore and protect water quality. In fact, watersheds also may define the appropriate spatial boundaries for total environmental and economic planning.

This approach provides the framework to evaluate natural resource problems using a natural systems approach. Controls developed at the national and state level must be combined with individually developed strategies for unique river basins, watersheds, and collection basins or receiving waters. Implementation and funding of protection efforts within watersheds motivates individual action and provides the public reasonable assurance that those asked to pay for clean-up will also enjoy its benefits. Watershed-based management provides a far better opportunity to resolve intergovernmental or interjurisdictional conflicts, establish goals and priorities through collaboration and consensus, and manage for results. Moreover, watersheds

allow for flexibility to address water quality/quantity problems and their interaction in different climatic settings.

Under EPA and state leadership, we can point to several useful examples of watershed *planning*, but more limited progress has been made in watershed *management*. Consequently, Water Quality 2000 recommends that:

- *Congress should create a new national program of watershed planning and management, including a mandate for implementation of activities as a condition of participating in planning.*

- *Congress should impose no particular management form on the states and should build upon existing watershed mechanisms. However, planning and management institutions should be required for all 21 of the major riverine watersheds in the United States.*

- *Congress should encourage, authorize, and approve the creation of interstate regional mechanisms, including joint federal-interstate compacts, as requested by states to plan and manage water resources. Where appropriate, watershed planning and management institutions should be nested, reflecting the multiple orders of progressively larger watersheds. Institutions created to manage smaller watersheds should participate in planning and management of the large watersheds to which they belong. Such a nested hierarchy could be organized at the top with an umbrella planning institution for each major riverine watershed. These institutions should include a mechanism to plan for protection of groundwater resources that cross watershed boundaries.*

- *Many of the other recommendations contained in this report -- including many of the pollution prevention recommendations -- should be implemented as needed to support the goals of individual watershed plans. Other activities particularly well suited for implementation under a watershed framework include (1) land-use planning, (2) drinking water delivery, (3) operation of water resources structures, (4) range- and pastureland management, and (5) urban lands management.*

GETTING FROM PROBLEMS TO SOLUTIONS -- THE TOOLS OF CHANGE

In our Interim Report, Water Quality 2000 identified several fundamental impediments to achieving the nation's clean water goals. At the conclusion of the report, these impediments were recast as specific challenges to ourselves and the broader community. These challenges provide a framework for organizing our 85 specific consensus recommendations.

Along with the three strategies for protection of surface and ground water resources suggested above, these recommendations comprise what we believe to be a representative and

balanced call to action. But despite the broad scope of issues addressed, these recommendations are still not comprehensive. Some important issues were either beyond the scope of Water Quality 2000 or the expertise of the participants. These included international water quality and water management problems, the effect of climate change on water resources, the need for a U.S. population policy, and appropriate funding mechanisms for all Water Quality 2000 recommendations.

In addition, consensus was not achieved on every issue discussed. Issues where Water Quality 2000 participants were unable to agree included: appropriate standards for control of combined sewer overflows; the need for an outright ban on underground injection of hazardous substances; the appropriate approach to prevent groundwater contamination from surface impoundments not subject to current law; the need for comprehensive federal groundwater legislation and national groundwater cleanup standards; and the role of risk assessment in establishing water quality priorities. Other areas of disagreement are noted in the report. In general, differences involved specific actions needed to implement agreed-upon goals.

Securing Public Commitment Through Education and Training

Environmental education for all ages can promote long-run societal changes that address the causes of pollution. Environmental education and training programs should be offered to a wide range of professionals, such as locally elected and appointed officials, legislators, industrial and utility managers, journalists, and teachers. Water resources professionals will require specialized training in natural resources fields, as will other natural resources managers.

Solutions lie in new programs of environmental education beginning in elementary school and continuing throughout all levels of education and professional training.

Preventing Pollution

Pollution prevention is at the heart of Water Quality 2000's Vision Statement and Goals. Perhaps our greatest challenge lies in preventing pollution associated with runoff from rural and urban lands. Preventing pollution from agricultural practices may return the most dramatic improvements in water quality because of the vast land areas used for agricultural production and the historical absence of attention paid to this source.

Solutions lie in implementing pollution prevention programs across all media and providing incentives so that all sectors of society will adopt prevention practices as a way of life.

Promoting Wise Use of Resources

Using resources wisely is conceptually analogous to preventing pollution. That is, rather than using water, energy, and natural and other resources wastefully and having to find more of them as a consequence, using resources wisely from the outset recognizes their value to

society, reduces impairment of ecosystem functions and values, and builds individual responsibility for protecting water resources.

Like pollution prevention, the potential to use resources more wisely exists in all sectors. Consequently, long-run solutions ultimately lie in educating society -- in changing the way society values water and natural resources. In the near-term, solutions lie in government programs, such as metering water use and others to improve the efficiency of water use, economic incentives to promote utility energy conservation, and programs to increase recycling of household waste and promote beneficial use of biosolids.

Managing Growth and Development

Inadequately controlled growth and development is the principal cause of water quality and water resource degradation in coastal zones and riparian habitats. Many activities associated with low-density development are potential sources of surface and ground water resource contamination.

Solutions lie in comprehensive, growth management aimed at reducing low-density sprawl, protecting aquatic resources from the effects of waterfront development, drawing attention to the connection between land use and the quality of groundwater, and other measures to protect aquatic resources from degradation associated with land development.

Increasing Scientific Understanding and Improving Technologies

Many current water quality problems can be solved with current technologies. In more limited instances, technological innovation is itself an impediment. Also, additional progress in water resource protection will occur only if we are prepared with a sound scientific understanding of the interconnectedness of institutions, ecology, and economics. While advancements in science and technology will have measurable near-term benefits, an even greater return from such advancements can be expected within, perhaps, the next 10 to 20 years.

Solutions lie in strengthening basic scientific activities, such as data collection and monitoring of the health of ecosystems, and in more applied endeavors, such as research and development in new pollution prevention technologies, methods to restore degraded habitat, or ways to evaluate the effectiveness of water conservation strategies.

Eliminating, Resolving, and Filling Regulatory and Legislative Overlaps, Conflicts, and Gaps

While a mix of voluntary and mandatory programs is appropriate, all of Water Quality 2000's Phase III Challenge Groups identified opportunities to improve our statutes and regulatory programs. Recommendations are presented in this section with the recognition that the list of improvements is incomplete. But because of the attention they received from hundreds of water

professionals, our hope is that these recommendations address the most important overlaps, conflicts, and gaps.

Recommendations include broader protection of wetlands and public water supplies, development of water quality criteria for all pesticides, restructuring federal farm commodity programs to remove disincentives for stewardship, improved regulation of the bottled water industry, and development of national septic system standards.

Strengthening Existing Federal Programs

Many ongoing programs administered by the U.S. Environmental Protection Agency, U.S. Department of Agriculture, U.S. Fish and Wildlife Service, U.S. Army Corps of Engineers, Bureau of Reclamation, and others are working well or could be improved with relatively minor changes. Still others have the promise of accomplishing goals but face resource constraints or political resistance.

This section highlights the many examples of such programs and makes recommendations regarding the nature of improvements needed to strengthen and continue them. Not all programs are covered; the absence of a program does not necessarily mean that it is not working or should be discontinued.

Recommendations for strengthening existing federal programs include development of effluent guidelines and standards for new and previously identified industries, adequate funding for NPDES permit programs, pretreatment program improvements, state promulgation of water quality standards for toxic constituents, prevention of spills by waterborne transport, and steps to reduce deposition of atmospheric contaminants.

Providing Incentives and Funding for Water Quality Improvements

The financing systems established for water programs must recognize that, in the end, we all contribute to water resource problems and we all must contribute to solve them. Although specific funding mechanisms were not addressed, Water Quality 2000 endorses a renewed federal commitment to financing water quality improvements, in part through general revenues. At the same time, by reducing costs through pollution prevention, individuals and private enterprise should gain some sense that remaining financing methods are relatively efficient and effective.

To the greatest extent possible, users of direct environmental services must be asked to pay the full cost of supplying the service (with safeguards to ensure lifeline services for those in need), in rough proportion to their individual levels of use; beneficiaries of investments in clean water must be asked to pay for such improvements in rough proportion to their receipt of benefits; and contributors to water quality impairment must be asked to pay for cleanup in rough proportion to the costs they impose on ecosystems.

A MANAGEMENT APPROACH FOR SOLVING WATER QUALITY PROBLEMS

Correcting the range of problems associated with U.S. water quality will require a long-term strategy that specifies what exactly is to be accomplished, who is responsible for assuring progress, and how incremental progress can be measured. It must recognize that all of society contributes to water quality impairment, that all of society benefits from improvements, and that all of society must contribute to solutions.

A sensible strategy will begin with several short-term actions--strengthening state and local infrastructure, consolidating overlapping authorities, and simplifying decision-making processes, for example. For the long term, however, solutions must engage all sectors of society. All levels of government, industry, professional organizations, the media, and individual citizens must all play a role.

NEXT STEPS – IMPLEMENTING A NEW NATIONAL WATER RESOURCES POLICY

This report and the Interim Report that preceded it present a wide-ranging discussion of current problems, the causes of these problems, and steps that we must take as a nation to achieve Water Quality 2000's vision: society living in harmony with healthy natural systems.

Implementing this vision will in many instances require fundamental changes in our governmental institutions, manufacturing or farming practices, and individual life-styles. The Water Quality 2000 member organizations are ready to move forward with a broad agenda for change that includes actions related to education, training, legislation, and regulation, science and technology, financing and incentives, and basic societal change.

As we approach the 21st century, ensuring healthy ecosystems and an adequate and safe water supply will require a sustained, collaborative effort by all sectors of society. Each of the organizations ratifying this report is committed to working individually and collectively to meet this challenge. We are optimistic we will succeed and urge all who care about protecting water resources to join us in this effort.

CHAPTER II

National Water Resources Policy – A First Step

Solutions to remaining water quality problems begin with policy principles that are molded into public and private programs by social, economic, and political forces. Water Quality 2000 has found ample evidence that a new national water policy is needed to integrate surface and ground water resources planning and management with related societal activities under a watershed framework. Based on the principles of resource protection and pollution prevention, programs must be designed to change the nature of the relationship between our natural environments and those that are artificially altered or used. Solving water quality problems -- changing the way society values water resources -- ultimately means incorporating concern for water resources in the way we live, farm, travel, produce, and consume. We must strive to integrate institutions, ecology, economics, and where appropriate, technology.

AN HISTORICAL PERSPECTIVE ON WATER POLICY

Much of the government and private activity in the 18th, 19th, and first half of the 20th century focused on managing water quantity. Water quality concerns have become more important in the second half of the 20th century. The boxed text on pages III-2 through III-4 traces the evolution of major U.S. policies for water resources planning and management.[1]

Since the birth of our nation, water policies have grown increasingly complex, as have the number of institutions and regulations put in place to manage or control water quality, water quantity, and aquatic resources. Water Quality 2000 has reviewed the basic principles that have evolved over the last 200 years of U.S. water policy history and has adopted the following principles as those needed to modify water quality efforts in the future:

- Water resources must be managed to sustain environmental values and the health of the economy;

- Approaches to water resource protection must emphasize avoiding or minimizing pollution and resource degradation rather than mitigating the effects of releasing pollutants into or disturbing ecosystems;

- All levels of government and the private sector have a role in working together to plan water use, conservation, and protection with the level of government most appropriate to the problem principally responsible for implementing the solution; and

- Water resource protection efforts should focus on environmental results within appropriate hydrologic units or watersheds, with successes and failures in attaining water resources goals reported regularly to the public.

HISTORICAL OVERVIEW OF U.S. POLICIES FOR WATER RESOURCES PLANNING AND MANAGEMENT*

1785 **First interstate compact** – adopted by state legislatures (Maryland and Virginia) to jointly manage a river basin (Potomac) for mutual benefit.

1848 **Swamp Lands Act** – first federal/intergovernmental water resources management initiative. Authorized land grants to states in lower Mississippi Valley that used proceeds from land sales to construct flood control and drainage works.

1908/ 1909 **Inland Waterways Commission/National Conservation Commission** – recommended comprehensive water quantity and quality planning; equitable sharing of costs among beneficiaries; consideration of relationship between water and land resources and; and creation of National Waterways Commission to coordinate federal water policy and activities.

1912 **National Waterways Commission** – formed.

1917 **Newlands Commission** – authorized (never created) to coordinate federal water activities.

1918 **Federal Power Act** – mandated Section 308 reports: comprehensive water resources plans for river basins (most plans focused on the need for large capital structures and water development projects).

1930s **National Resources Commission/National Resources Planning Board** – developed water management plans for most U.S. watersheds (but lacked authority to implement them).

1950 **Hoover Commission** – proposed, but never prevailed in combining almost all federal water resources programs into a single cabinet department to minimize conflicts, centralize decision making.

1953 **Truman's Water Resources Policy Commission** – proposed, but never implemented joint federal/state river basin commissions to address quality and quantity planning and management.

1959 **Senate Select Committee on National Water Resources** – introduced concept of water quality management to meet water quantity needs.

1961 **Senate Select Committee on National Water Resources** – recommended that federal investment in water resources be split 80/20 for quality/quantity; coordinated intergovernmental water resources planning for all major U.S. watersheds; federally funded water research, periodic watershed-based assessments of supply/demand, and grants to states to simulate their participation. Considered by many a landmark report.

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*Note: only those statutes marking major milestones in the evolution of water resources planning and management are presented in this list.

HISTORICAL OVERVIEW OF U.S. POLICIES FOR WATER RESOURCES PLANNING AND MANAGEMENT*
(Continued)

1965 **Water Resources Planning Act** – created U.S. Water Resources Council to implement national strategy for planning of water and related land resources in 21 water regions and coordinate federal water policy. Abolished in 1980 after mixed success.

1968 **National Water Commission** – began five-year comprehensive study of U.S. water policy. Report in 1971 recommended sweeping changes in outdated policies and programs, including full-cost user fees to pay for water projects; shift to local water planning management where benefits are localized;and implementation of the "polluter pays" principle.

1972 **Water Pollution Control Act Amendments (Clean Water Act)** – initiated four new water planning programs; state program plans, municipal wastewater treatment facilities plans, areawide water quality plan, and basin planning.

1976 **National Commission on Water Quality** – concluded that Congress underestimated resources needed to attain clean water; planning process was not working; runoff controls did not exist; intergovernmental responsibilities in flux.

1987 **Clean Water Act Amendments** – introduced Section 320 National Estuary Program to plan for and manage the restoration and continued protection of estuaries of national significance, on a watershed basis. Also introduced Section 319, state nonpoint source management planning on a watershed basis.

- Policies and programs should adopt a holistic resource protection perspective, taking into account the interconnectedness of quality and quantity of surface water, groundwater, and aquatic and related land resources;
- Programs to protect water resources should include a mix of voluntary and mandatory approaches;
- A sound scientific understanding of natural and artificially altered environments and their interaction is critical to improving the quality of both; and
- Beneficiaries of investments in water resources should generally pay the full cost of these investments, while contributors to water quality impairment should fully internalize the cost of their polluting activities.

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*Note: only those statutes marking major milestones in the evolution of water resources planning and management are presented in this list.

While many have conceptualized similar principles and progress has been made, not all water quality goals have been achieved. The reasons for not accomplishing all of our goals are not surprising: they include differences in policy approaches between Congress and the Administration; lack of funding; changes in political philosophy from one administration to another; lack of a sustained "crisis" to keep the public focused on solutions; and abuses of a policy principle for purely political reasons.

For a variety of reasons, we believe that the nation is ready to and, indeed, must now embrace a new water policy and act upon it decisively. Only recently, for example, have public opinions overwhelmingly supported environmental values. In part, this is because population densities, especially in fragile coastal regions, have begun to overburden the carrying capacity of local ecosystems. Water quality problems appear more acute under such conditions, leaving in some areas little or no room for additional stresses and ultimately posing significant impediments to economic well-being and reductions in the quality of life. Droughts of a magnitude once thought endemic only of arid western regions are now much more common across the nation, even in some heavily developed, but water-rich eastern watersheds.

Moreover, the gap is clearly growing between the level of environmental quality the public wants and the resources available to deliver it.[2] Congressional mandates continue to expand programs and require investment to improve the quality of the nation's waters. Yet budget deficits at all levels of government make it increasingly difficult -- some say impossible-- to fund all these mandates. Under such circumstances, choices are limited: keep resources constant and accept a lower quality environment; improve the environment by shifting spending from other programs; or demand more efficient solutions to water quality problems.

In our call for a new national water policy, Water Quality 2000 has chosen the third strategy because it is the only one that can be sustained in the longrun. We have structured our own deliberations to include the diversity of views needed to implement such a strategy, with individual members from all disciplines and perspectives ready to take action on our recommendations. Our call for a new national water policy will be different from previous efforts only to the extent that participants in the Water Quality 2000 process take individual and collective responsibility for action. All 86 Water Quality 2000 members are committed to do just that.

The fundamental principles listed earlier are the building blocks of water resources policy. As such, they form the foundation for the full range of recommendations presented in this report. When these principles have been observed in current water resources policies and programs, we can point to many successes. When we have ignored these fundamentals or have failed to fashion field-level programs based on them, water resources protection programs have been less successful. For example, the United States has no unified national water policy that observes the principles of integrated water and land resource planning and management within which, individually and collectively, citizens and institutions work to prevent contamination and protect ecosystems. Instead, today's water policies comprise a patchwork of narrow, often conflicting objectives; jurisdictional conflicts mark both the legislative and executive branches of the federal government and some states; sound economic principles are often missing in

resource allocation decisions; and many of the causes of water quality impairment remain under- or unaddressed.

A NATIONAL STRATEGY FOR PROTECTING WATER RESOURCES

The single most important recommendation to emerge from Water Quality 2000's Phase III Challenge Groups is a call for a new national policy for total protection of surface and ground water resources based on the concepts of:

- Protecting water resources by preventing pollution;
- Empowering all segments of society to contribute to water quality improvements through individual and collective responsibilities; and
- Planning and managing water quality and quantity on a watershed basis.

In short, an integrated national water policy that supports society living in harmony with healthy natural systems.

In this and the following chapter, Water Quality 2000's recommendations for establishing new policy directions and implementing new programs recognize that some existing systems work well while others do not. Building from a current base, our challenge is to formulate a new water policy for the nation that addresses the entire resource, engages all levels of government and the private sector, and encourages harmony between the natural and artificially altered environments. It must strengthen on-going activities where needed and coordinate them with new tools to improve water quality. Putting principle into practice will require weaving these activities into the fabric of American society through education, research, and accountability.

Chapter III addresses these and a range of related issues, and recommends the tools to implement these strategies such as education, incentives, finance, management, regulation, and training. General observations on each of the strategies are presented here.

Integrating Groundwater and Surface Water Policy. An integrated, holistic national water resource policy will promote the protection of both surface and groundwater. A national policy that recognizes the earth's hydrologic cycle will allow us to account for the interactions between groundwater and surface water as we develop goals and programs to protect surface water, wetlands, drinking water, and aquatic life. Currently, for example, most groundwater protection programs ignore the impacts of groundwater contamination on surface water and ecosystems.

Integrating groundwater into water resources policy requires the recognition of a number of fundamental principles:

- Groundwater and surface water are interconnected;
- Groundwater is an essential national resource that must be protected;

- It is harder to monitor and clean up groundwater than surface water; and
- Issues involving groundwater and surface water quantity and quality are fundamentally linked.

To address these principles, Water Quality 2000 recommends that Congress adopt a national ground water protection policy. This policy should include a national goal of groundwater protection. It should also incorporate the specific federal actions recommended in this report.

Historically, most groundwater protection activities have occurred at the state level. There is disagreement, however, as to the adequacy and effectiveness of these programs. Under a new national policy all states should adopt comprehensive groundwater protection programs that integrate groundwater and surface water protection activities. These programs should emphasize pollution prevention strategies and include adequate groundwater mapping and monitoring, controls on all significant sources of groundwater contamination, controls on groundwater withdrawals, and effective enforcement and other compliance tools. Water Quality 2000 could not agree on whether the federal government should play a more comprehensive role in establishing and overseeing groundwater protection programs.

Preventing Pollution and Degradation of Water Resources

Just as an ounce of prevention is worth a pound of cure, avoiding the degradation of natural systems is preferable, on ecological and economic grounds, to mitigating damages after they have occurred. Preventing pollution and water resource impairment before they become management problems may be the most efficient and effective means to move toward total resource protection and, ultimately, toward a sustainable society.

While most observers are probably familiar with the implications of pollution prevention for the industrial sector, pollution prevention is equally applicable and useful as a guiding principle for other sectors or sources of water quality impairment. Pollution prevention is particularly well suited to address contaminated runoff from agriculture and urban lands. Applications of pollution prevention in the agricultural sector may be the only practical and economical way to reduce widespread impairment of aquatic ecosystems from farm practices. Agricultural pollution prevention means altering farm cropping systems and management practices to reduce off-farm transport of sediment, nutrients, and pesticides that have harmful effects on ecosystems and to protect riparian zones and channel morphology. In terms of urban and suburban land development and transportation, preventing pollution means designing structures to minimize physical disturbances to ecosystems and prevent runoff of harmful constituents from contaminating waterbodies.

The Pollution Prevention Act of 1990 provided an important first step toward institutionalizing pollution prevention for all sources by declaring that pollution prevention was a "national objective."[3] It established a hierarchy of environmental protection priorities as national policy, whereby pollution should be prevented or reduced at the source whenever

feasible; where pollution cannot be prevented, it should be recycled in an environmentally safe manner; in the absence of feasible prevention and recycling opportunities, pollution should be treated; disposal should be used only as a last resort.

In one provision, the Act directed EPA to facilitate the adoption of source reduction techniques by businesses and federal agencies, establish standard methods of measurement for source reduction, and investigate opportunities to use federal procurement to encourage source reduction. It will be critical for EPA and others to implement programs under the Act in full recognition of the broad application of pollution prevention principles to all media, all causes of environmental degradation, and all sectors of the United States economy.

In particular, Water Quality 2000 has identified pollution prevention solutions suited to agriculture, forestry, households, land development, transportation, energy, and manufacturing. Detailed recommendations in each of these areas are presented in Chapter III, and an overview is presented in the following sections.

Agriculture

Polluted runoff and leachate from agricultural activities has been identified as a major cause of impairment of our nation's waters. In addition to direct effects on water quality, runoff from agricultural activities can also cause physical habitat alterations and flow and riparian modifications. Although some progress has been made, the "way we farm" must be changed to prevent pollution to the maximum extent possible, while maintaining economically viable farming operations. Preventing pollution is as applicable to agriculture as it is to industry and the payoffs are potentially much larger. To date, scant attention and limited resources have been dedicated to addressing the effects of agriculture on water quality. While agriculture is widely considered to be the nation's biggest nonpoint cause of water pollution, it is often treated separately and less strictly than other sectors.

A strategy for this sector includes establishment of a national, water-quality-focused, framework to prevent agricultural pollution, the strengthening of state level agricultural runoff and leachate prevention programs, and local, waterbody or aquifer-specific implementation based on watershed approaches and farm-level resource management plans.

Most agricultural control practices have evolved from the need to minimize loss of productivity and costs associated with increased production. Water quality benefits have been a secondary consideration. As a result, existing efforts have been fragmented, narrowly focused, and have failed to effectively integrate prevention strategies for pollutants derived from soil loss, nutrients, and pesticides. However, there are indications that contamination from agricultural sources can be significantly reduced.

The failure of the federal government and most states to develop and fund comprehensive agricultural runoff and leachate pollution prevention programs has been a major impediment to agricultural pollution prevention. More specifically, the lack of technical and financial assistance

and educational outreach efforts and the purely voluntary nature of many runoff and leachate pollution prevention programs have clearly hampered implementation efforts.

Things must change on the farm, but there can be no quick fix. Federal and state governments must make agricultural pollution prevention a priority and give it increased attention and funds. In addition, individual farmers must become more knowledgeable and aware of the consequences of their actions and the alternatives that are available. Ultimately, it is farmers who must act to protect water quality and it is in their own economic and environmental best interest to do so.

A National Framework for Agricultural Pollution Prevention. Congress must make a clear statement that the prevention of agriculturally derived water pollution problems is a national priority. The most important single step would be for Congress to amend the Clean Water Act and transform the existing, unevenly implemented Section 319 program into a fully funded pollution prevention program. This program should have a priority commitment similar to programs now in place to prevent and control water pollutants derived from point and solid waste sources.

Specifically, Congress should amend the Clean Water Act to strengthen Section 319 in the following ways:

- Congress should designate EPA as the lead agency to develop a pollution prevention framework as part of Section 319. In its role as lead agency, EPA must work with other federal agencies to provide guidance and oversight needed to implement strong state programs.

- EPA should require states within two years from date of enactment to develop, and within five years to implement, comprehensive agricultural pollution prevention programs with enforcement authority. These programs should incorporate pollution prevention as their cornerstone and be one component of a state's comprehensive nonpoint source management program. These programs should be revised, updated, and resubmitted to EPA for approval every five years. Approval should be at the EPA headquarters level to assure consistency but should also recognize the variability between the states and the need for flexibility. EPA's approval process should include input from USDA and other federal agencies as appropriate. State programs should be required to include an implementation schedule with reportable milestones.

- EPA should be responsible for assuring that its program development and implementation have input from and are coordinated with other affected federal, state, and local agencies through some formal arrangement. EPA's oversight should be performed in close cooperation with the U.S. Department of Agriculture and other affected federal agencies. EPA should coordinate all reporting and review requirements of other agencies.

- In consultation with USDA, EPA should develop water quality criteria for sediment, nutrients, and pesticides so there will be a clear definition of the goals expected to be achieved in individual streams, lakes, wetlands, and groundwater systems.

- EPA, with the participation of USDA, should be directed to undertake a study of the major federal programs that affect farm policy and farmers' decision making to ensure their compatibility with the goal of preventing pollution from agricultural activities. If federal programs are found to have the effect of encouraging runoff or leachate problems, the study should recommend to Congress and the appropriate agencies program modifications or termination to remove this effect.

- USDA should be the lead federal agency for implementation and technical assistance at the local level.

- States should be directed to take mandatory and fully enforceable steps where necessary to achieve water quality standards.

- Congress should authorize and appropriate Section 319 program development matching grants at levels sufficient to assure adequate programs nationwide.

- Congress should establish new Section 319 grants to states to capitalize state revolving loan funds for implementation of agricultural pollution prevention activities. These capitalization grants should require a state match and provide states maximum flexibility to direct loans to the highest priority watersheds, at terms that suit individual needs.

- Congress should establish sanctions to help assure that all states develop and implement approvable Section 319 programs that include agriculture. If EPA cannot approve a state program, that state should lose eligibility for Section 319 funds. EPA must then develop and implement a 319 program for states without EPA-approved programs.

<u>State Agricultural Pollution Prevention Programs</u>. State agricultural pollution prevention programs should, at a minimum, contain the following elements:

- <u>Education</u>. Many farmers are not aware of how their farming practices affect water quality. Thus, education outreach efforts should be a primary component of all state programs. Educational efforts should be broad-based to provide all farm operators with basic information before farm-level efforts can be implemented.

- <u>Program Assessments</u>. A key element of agricultural pollution prevention is to give greater priority to water quality improvements. The overall intent should be to target those local and regional actions that provide the greatest improvement in water quality. This strategy goes beyond water quality monitoring to effectively managing for environmental results. Best management practices may be used, but these actions should be designed to

attain water quality objectives. In addition, regional, state, and national assessments must be made to provide national accountability for our cleanup efforts.

• Research. Better research and development capabilities are needed to understand the effectiveness of management practices and to develop new, more environmentally friendly, agricultural techniques. As a beginning, states that may not have incorporated water quality considerations into their recommendations for nitrogen and phosphorus use from all sources should revise their current recommendations to ensure that water quality impairments and environmental degradation do not occur. States need to coordinate with national research efforts to avoid duplication. State research may be necessary to fill gaps that national research efforts will not address.

• Monitoring. States should develop and implement monitoring systems that will enable program managers to determine historical and seasonal background levels of natural contaminants; set priorities for areas needing special attention; and monitor water quality improvements following the installation of best management practices. To save costs and encourage local level ownership, school and citizen monitoring should be encouraged. Adequate sampling and analytical controls are necessary to ensure quality and accuracy of results.

• Technical Assistance. States must work with USDA and universities to make technical expertise and assistance available to farmers, ranchers, and other agricultural land managers. Controlling agricultural runoff and leachate will mean changing the way we farm, which will require increasing the number of professionals having knowledge of land use-water quality relationships. Our ability to provide technical assistance and professional guidance must be expanded so that individual farm operators can improve their management practices and skills.

• Financial Incentives. Financial assistance and incentives should be a key component in all state agricultural pollution prevention programs. Without financial assistance, many farmers and ranchers will not be able to implement the necessary best management practices to protect water quality. Financial assistance can take the form of tax credits, cost-sharing through existing state and federal agricultural programs, or funding through newly established state programs. In addition, state or federal programs that have the effect of encouraging runoff or leachate problems need to be identified and terminated or modified.

• Regulation. Effective agricultural pollution prevention programs will have a mixture of voluntary and regulatory controls. While voluntary elements may be desirable, progress in many cases cannot be achieved through purely voluntary efforts. Where water quality standards are being violated or where there is a probability of water quality standards being violated, an iterative approach of implementing more stringent mandatory or regulatory control measures should be adopted.

• Targeting and Program Management. There is a pressing need to target limited financial and technical resources at our most critical and valuable water resources and to

impaired watersheds, with additional priority directed towards projects having strong local support. A single, responsible agency at each level will need to be identified. All agencies involved in targeting areas for pollution prevention measures and monitoring need to closely coordinate, communicate, and cooperate. Implementation of comprehensive improvement projects usually will begin at the headwaters of the watershed. To ensure local involvement and ability to develop clear water quality objectives, many projects will occur at scales of 40,000 acres or less. In some instances, implementation of projects as large as 250,000 acres will be manageable.

- Penalties for Noncompliance. Where regulatory or mandatory approaches are required, the responsible state agency should have the authority to impose fines, civil penalties, or other sanctions for noncompliance. EPA should approve a state program only if the state certifies that it has enforcement authority against individual farmers who fail to develop and implement farm-level resource management plans in watersheds that meet the criteria for mandatory preparation of such plans.

In addition to the financial assistance already discussed, EPA and USDA will need to provide technical assistance to states in developing these comprehensive agricultural pollution prevention programs.

The following types of activities should be eligible for federal support: (1) education for farmers regarding how their farming practices affect water resources; (2) monitoring, research, and development to target resources, measure progress, and develop new prevention methods; and (3) technical assistance to farmers through conservation districts, the USDA Extension Service, state conservation agencies, private industry, farm organizations, and non-profit groups regarding the preparation of farm-level resource management plans; (4) the identification and development of cropping systems, farming practices, and other measures; and (5) the implementation and enforcement of these measures.

Farm-level Pollution Prevention. Every farm operator should be encouraged to go through a holistic planning process for their farm operation that takes into account the water quality impacts of various cropping systems and farming and livestock practices, including water management.

Ideally, farm-level resource management plans should be developed for all farming and ranching operations. One of the primary goals of these plans should be to ensure that water quality impairment and environmental degradation does not result from agricultural operations. The objective of plans should be to prevent leaching and runoff to the maximum extent possible, while maintaining an economically viable farming operation.

To accomplish this objective, farmers should consider a wide array of technologically and economically feasible systems and practices, and then select those that can function together to meet their farming goals and prevent water quality impairment. These plans should include an implementation schedule and should be approved by the boards of local conservation districts or other designated approval authorities, according to minimum state standards. Plans should at

least address practices to prevent pollution from sedimentation, nutrient and pesticide handling and application, animal wastes, and irrigation practices.

Farm-level resource management plans should be mandatory for all farms in watersheds where surface waterbodies or groundwater systems are impaired or where there is a probability that these waterbodies or systems will become impaired. Further, in watersheds that are not determined to be threatened or impaired, if individual owner/operators are causing significant pollution or are clearly violating water quality standards and the situation cannot be resolved expeditiously by voluntary programs, these individuals should also be required to develop and implement farm-level resource management plans.

Until EPA issues and the states adopt water quality criteria and standards for sediments, nutrients, and pesticides, states will have to designate waterbodies and systems susceptible to these pollutants. In watersheds where plans are mandatory for all farm operations, states can target their efforts to address priority operations first and plans can vary in detail according to these priorities and the size and complexity of the farm operations.

Forestry

Although forestland is recognized as being a major source of the nation's higher quality waters, the Clean Water Act, as amended, requires the control of runoff resulting from silvicultural activities as one means of meeting goals of the Act. Runoff with potentially high levels of sediment, nutrients, and pesticides can result from construction of logging roads, skid trails, fire breaks; site preparation for tree planting; and from silvicultural operations themselves. Thermal stress to streams also can occur when trees are removed from riparian watercourse banks. Other major stressors are loss of physical habitat structure and low flows that result from logging and the increased frequency of mass soil movements and sluice outs.

Section 319 of the Clean Water Act requires that state nonpoint source management plans require the inclusion of goals and strategies for reduction of pollution caused by silviculture activities. These state forestry runoff strategies should :

- Ensure implementation of BMPs chosen from among the many alternative strategies, while including measures of accountability with reportable milestones to assure that water quality goals are met;

- Adopt a holistic watershed approach focused on preventing, not remedying, pollution, including specific water quality-based goals and a water quality prioritization system for program implementation for each watershed;

- Promote implementation at the lowest practical levels of government, supporting effective partnerships of landowners, industry, universities, and state and federal organizations;

- Require that all publicly owned lands be managed as models, internalizing the costs of water quality impacts, or conversely, the value of watershed protection, into timber sale prices ; and

- Require the recognition of the value of maintaining land, including wetlands, in forest cover, reforesting problem lands, establishing forested buffers, and the retention or establishment of trees on floodplains or riparian areas.

The management plans should include components for (1) development of state BMP handbooks; (2) forest-user education; (3) technical assistance on BMP design, installation, and maintenance; (4) state or federal cost-share payments under USFS or other USDA programs; (5) a mixture of voluntary and regulatory programs; and (6) program effectiveness tracking and reporting.

To be implemented effectively, the program will need, among other things, adequate funding and staff. In a recent survey by the National Association of State Foresters,[4] lack of funding (32 states) and staffing constraints (28 states) were most frequently cited as barriers to implementation of state forestry runoff management programs. Furthermore, 8 states reported lack of political support as a barrier and 18 of the 46 responding states indicated the need for technical assistance to develop further their runoff control programs for forestry.

Land Development

Inadequately controlled land development contributes significantly to the impairment of water resources. It is a principal cause of water quality and aquatic resource degradation in coastal zones and riparian areas. Low-density development has been recognized as one of the most destructive land use patterns because it eats up the natural landscape, requires extensive infrastructure to support it, and leads to increased automobile use and stormwater runoff.

While agricultural sources may be the biggest existing runoff problem, land development is the biggest future concern. In the framework of pollution prevention, dealing with land development may be even more important, as evidenced by the huge costs estimated for correcting problems caused by stormwater runoff and combined sewer discharges in already developed areas.

Land use planning and growth management must be considered an integral part of comprehensive pollution prevention plans. It is easier, more efficient, and much more cost effective to implement a system of controls prior to development than to clean up the water quality degradation after it has occurred.

Land use decisions have historically been made based largely on economic considerations, without adequately taking into account the need to protect forests, wetlands, and other important resource lands, or to avoid fragile and erodible soils, steep slopes, and other sensitive areas. Government and the private sector must work together to correct existing problems and ensure

that communities of the future are planned better, built better, and designed to enable residents to live in a manner that is more protective of land and water resources.

A National Framework for Land Development Pollution Prevention

A national strategy for preventing pollution caused by improper land development should parallel and be integral to that recommended and adopted for agriculture and other sources.

At the federal level, Congress should amend Section 319 of the Clean Water Act to make a clear statement that preventing water resource degradation from land development is a national priority. EPA should again be identified as the single lead agency, requiring the states to develop and implement, by a date certain, comprehensive pollution prevention programs for land development activities. Section 404 of the Clean Water Act should also be strengthened to protect, maintain, and increase our wetlands base from current levels, wherever possible, to fully functioning and self sustaining wetlands.

State Land Development Pollution Prevention

State-level programs should have the same basic elements as those recommended for agriculture. States, along with regional watershed authorities, should be the vehicle for providing education, technical assistance, and regulatory oversight to ensure implementation and enforcement at the local level.

State land development pollution prevention plans should be developed in conjunction with affected federal, state, and local governments, watershed management entities, and the public, and should at a minimum contain the following elements:

- Education. Many citizens, planners, and public officials are unaware of the relationship between land use and water quality. Education on the hydrological and environmental consequences of developing beyond the land's or water's carrying capacity (including groundwater depletion or contamination) must be an integral part of land development pollution prevention;

- Growth Management. A variety of regulatory tools and incentives are needed to preserve open space and agricultural lands, encourage more compact development patterns, and protect water resources from the effects of development. New development should be directed to land areas which can support higher densities, minimizing problems caused by urban sprawl and preserving sensitive ecological resources. In already developed areas, further impacts should be minimized through establishment of increasingly more protective measures;

- Transportation. States must recognize and address the role of highways in encouraging low-density development. Newly developed areas must include transportation systems that move people and goods while protecting air and water quality. Alternatives to automobiles

need to be provided, and roads and other transportation facilities must be designed and operated to reduce their impact on water resources.

- Urban Runoff. Effective techniques, such as on-site retention and use of vegetated aquatic treatment systems (VATS), must be incorporated into new development. In already developed areas, reducing the volume and contamination of urban runoff through these techniques can also help to alleviate problems associated with combined sewer discharges;

- Environmentally Sensitive Areas. Wetlands, coastal zones, floodplains, and erodible soils must be identified and protected from damage and destruction by land development activities. Care must be taken to avoid shifting development from environmentally sensitive areas to productive agricultural lands, leading to cultivation of less productive lands that are more erodible and require greater inputs;

- Groundwater Recharge Areas. These areas need to be mapped and appropriate policies developed to regulate land uses leading to groundwater pollution. These should include siting criteria for newly developed areas and increasingly more-protective measures in already developed areas;

- Greenbelts and Buffer Zones. Open space, forest cover, and green buffers provide filters for pollutants, wildlife habitat corridors, and recreation areas. They should be incorporated into any new land development. In already developed areas, efforts should be made to assemble undeveloped parcels into larger tracts;

- Wastewater. Collection and treatment systems in newly developed areas should be designed to facilitate the use of reclaimed water for irrigation of golf courses and other open spaces. In unsewered areas, minimum standards for septic tank systems, innovative treatment technologies, and self-financing local septic control districts should be encouraged;

- Drinking Water Protection. Consumers must pay the full cost of providing safe drinking water to newly developed areas. Efforts to prevent pollution and protect drinking water sources on a watershed basis reduce the need for additional treatment and help keep costs reasonable;

- Solid Waste Management. Landfills, incinerators, and other solid waste management facilities must be located and constructed so as to prevent pollution of ground and surface waters;

- Research. Government and academia must develop and/or refine integrated analysis tools that consider economics, ecology, technology, and institutions for application by local land use planners and zoning officials.

Local Land Development Pollution Prevention

Against the backdrop of state and federal mandates, local and watershed-based authorities must take a proactive stance on growth and development by adopting, implementing, and enforcing land use plans that are compatible with restoration and maintenance of high-quality water resources and suited to the watershed in question. This may require the establishment of new management authorities, such as stormwater utilities, and adoption of new or amendment of existing land use plans to regulate activities in sensitive natural areas.

Transportation

New state and federal regulations (including the federal Clean Air Act amendments of 1990) that require all forms of transportation to operate with increased efficiency and reduced levels of contaminant discharges are a major step in the direction of pollution prevention in the transportation sector. Timely implementation of other Clean Air Act provisions also will foster reduced pollution caused by transportation. Other types of government regulations may be needed to attain these goals. Corporate Average Fuel Economy Standards (CAFE), for example, are among those factors principally responsible for increasing on-road automobile efficiency since 1973. Continuous improvement in fuel efficiency will help to attain water quality standards. Government intervention may be required to improve fuel efficiency while maintaining vehicle size, performance, and safety. Some controversy remains, however, over the standards that may be achievable, given current technologies.[5]

Beginning now and for the longer term, transportation planning policies must focus on moving people and goods with feasible reductions in energy use, emissions, and disruption of aquatic resources and habitat. The promotion and use of carpools, vanpools, carpool lanes, mass transportation, and bicycles instead of individual automobiles can offset demands for millions of gallons of fuel and prevent the generation of a wide variety of pollutants and the degradation of aquatic ecosystems normally associated with the transportation activities themselves and from oil exploration and extraction and fuel production, distribution, sale, and use. Where transportation systems are clearly needed, they should be planned and executed with the protection of wetlands, riparian habitat, coastal waters, and ground and surface water resources in mind. In short, state transportation agencies must comply with all applicable environmental regulations and coordinate their activities early in the planning stages with state environmental agencies.

Local transportation planners, as well as state and federal agencies and the private sector, must do more to stimulate the use of mass transit in high-density urban areas. Examples of appropriate incentives include gasoline taxes, expanded commuter parking facilities in urban fringe areas, incentives for use of mass transit and carpools, and more stringent enforcement of auto emissions regulations.

Individuals can also aid in reducing contamination by ensuring that automobiles are properly tuned and operate on the highest quality fuels and lubricants possible. Avoiding excessive acceleration, unnecessary idling, excessive speeds, and under-inflated tires leads to

increased fuel efficiency and reduced friction that, in turn, reduces the level of contaminants released to the environment.

Transportation needs, and in turn, pollution caused by transportation, can be reduced through cluster land-use planning that includes walking and biking access between home and work and increased use of electronic communication devices for business purposes. The use of salt to deice roadways also can be keyed to land use, with highly sensitive watersheds signalling moderate or no use of salt for such purposes.

Households

In the short run, before the effects of citizen education are fully realized, governments may have to impose certain programs to prevent pollution caused by the household sector. Options include:

Product and Labelling Standards. Existing product and labeling standards, such as fuel economy standards for automobiles; appliance and plumbing fixture efficiency and labelling standards to help save energy and water; and insulation and lighting efficiency standards for new homes make it easier for consumers to purchase goods that prevent pollution. Additional packaging practices now under consideration can help consumers to reduce the amount of garbage they produce.

Programs to Make Pollution Prevention Easier. Given hectic, modern day life, even the best-intentioned consumer may avoid responsible actions if they are inconvenient. For example, recycling is far more likely when curbside pickup is provided than when trips to distant collection locations are necessary (pickups should be integrated with regular garbage pickup to avoid additional vehicle miles traveled). Householders are more likely to separate hazardous waste when adequate collection facilities are provided. Access to yard waste compost from government facilities will encourage the use of these materials over chemical fertilizers.

Financial Incentives. Often it is easier for individuals to prevent pollution when the cost of doing so is not prohibitive or when a financial incentive makes it more desirable to do so. For example, the government can help encourage water and energy conservation by providing tax credits or deductions for investments in energy and water efficiency. The government can discourage waste through pricing practices, such as use-based metering of water.

In the longer term, education is the key to citizens adopting practices in their homes, at work, and during recreation that, taken together, will have the effect of preventing pollution. Worldwide fossil fuel exploration, extraction, processing, and transport will be reduced, for example, as households reduce energy consumption by improving the energy efficiency of home lighting, heating, cooking, and cleaning. In turn, these conservation efforts will prevent aquatic pollution normally associated with fossil fuel exploration, extraction, processing, and transport. In many instances, preventing pollution will help to restore damaged ecosystems.

Water conservation in the home also helps prevent degradation of aquatic ecosystems. A wide range of inexpensive options to use less water are available to homeowners, with little, if any, effect on quality of life. Examples include displacement devices to reduce water use in toilets, low-flow shower and faucet heads, fixing water leaks, using commercial car washes that recycle wash water rather than washing cars at home, or watering lawns early in the morning to avoid excessive evapotranspiration. Water conservation reduces withdrawals from natural systems, leaving more water for habitat and promoting biodiversity. Water conservation also reduces the hydraulic loading on wastewater treatment plants, which in turn, may improve their operational efficiency and lessen the need for expansion to accommodate population growth.

Recycling materials used in the home, such as newspaper, glass, aluminum and steel cans, cardboard, and plastics, may minimize extraction of virgin materials and can reduce the generally higher levels of industrial waste generation associated with manufacturing of products from virgin feedstocks as opposed to recycled ones.[6] Using recycled paper in our businesses and limiting or stopping wasteful paper use is also important. For example, it is estimated that the energy needed to produce and distribute all the junk mail Americans receive in one day is sufficient to heat 250,000 homes.[7] As consumers, we can encourage industries to "precycle," or reduce their use of excessive packaging, by demanding products that use less packaging, where consistent with applicable federal and state requirements.

Households should be encouraged to use correct application rates or less harmful substitutes for many pesticides, fertilizers, high-phosphate products, household cleansers, and solvents. Reduced demand for harmful household chemicals will result in a reduced discharge of harmful materials and nutrients to the environment. In replacing commonly used materials with "home remedies" care should be taken that their interaction does not produce more harmful conditions than would the replaced substitute.

Energy

Several energy-related pollution prevention strategies require actions by homeowners, businesses, industry, and the transportation sector to reduce energy demands and consequently, reduce the attendant pollution associated with energy resource exploration, extraction, transportation, production, and use. Both mandatory and voluntary programs will be needed in this sector. EPA's on-going "Green Lights" program, in which the agency is working with large industries to replace conventional lighting systems with energy-efficient substitutes, is only one example of an effective voluntary program.

Chapter III presents an array of recommendations for mandatory programs, such as least-cost utility planning and amendments to rules governing cost-recovery for utilities to allow them to earn a rate of return on investments in energy conservation comparable to their returns on building new capacity. Other government actions to promote pollution prevention in the energy sector include:[8] (1) a federal production tax credit for renewable energy supplies; (2) government-mandated, "feebate" programs, where fees on the use of energy-inefficient products are rebated to users of efficient ones; (3) government-set building and equipment energy-efficiency standards; and (4) mandatory energy-efficiency programs for government buildings.

In addition, the energy sector could prevent pollution and avoid some of the losses to aquatic habitats by substituting non- or less-polluting sources of energy for fossil fuel or nuclear energy production. Such substitutions are clearly complex in that they require evaluation from many different perspectives in addition to water resources protection, including national security, technological feasibility, regulatory acceptability, life-cycle analysis, and cost-effectiveness. In Water Quality 2000's view, under these multiple criteria, significant opportunities would exist to promote wind, solar, and biomass energy.

As in the transportation sector, state energy agencies must demonstrate leadership in compliance with environmental regulations. This will entail closer coordination with state environmental agencies and incorporation of concerns for water resources earlier in energy planning processes.

Industry

Until recently, Congress and EPA have focused their efforts on treating industrial waste after the point of generation rather than preventing or reducing its generation in the first place. Even through most are subject to permits, manufacturing sources still accounted for the release of hundreds of millions of pounds of hazardous* materials into waterbodies and transferred to POTWs in 1987-1989[9]. Nonetheless, industry has had a long history of preventing pollution without identifying it as such; industrial engineers have sought ways to improve productivity, which inevitably involved producing more product and less waste per unit of materials supplied as input to industrial process.

In the past few years, however, pollution prevention statutes and escalating waste disposal costs increasingly have promoted source reduction and recycling over waste treatment and disposal. From the resource extraction or generation to the manufacture, use, and disposal of hazardous constituents, opportunities may exist to reduce these constituents and to prevent their release to the environment. As of October 1991, for example, Congress and 25 states had passed pollution prevention laws, the majority within the last three years. All state laws cover at least the waste regulated by RCRA, and some laws include those defined in the Superfund Amendments and Reauthorization Act of 1986 (SARA). Most statutes stress outreach and assistance in a collaborative facility planning approach. Other common program components also are predominately non-regulatory: waste minimization curricula in colleges, information exchanges, research grants, recognition programs, training, and expertise referral systems. Some states require reporting. Some states, such as Massachusetts, after studying reports submitted by industries for a number of years, may impose source reduction mandates.

A basic element in these programs in the use of a mix of regulatory and non-regulatory means of having industrial facilities create and implement plans to prevent pollution within their

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*The word "hazardous," when used in this report, is not intended to refer to any specific statutory definition but instead is used broadly to mean any materials that, when released, are harmful to public health or the aquatic environment.

own facilities. Voluntary preparation of pollution prevention plans maximizes the ability of industries to innovate pollution prevention policies. However, regulatory requirements can ensure that all members of an industry evaluate pollution prevention alternatives within their facilities to an equal degree.

Pollution Prevention Planning

Water Quality 2000 endorses pollution prevention planning statutes and programs. These incentives serve as effective companions to a range of other forces, that together, are beginning to reduce the release of hazardous pollutants: SARA Section 313 Toxic Release Inventory (TRI); the rapidly increasing costs of waste management as treatment and disposal sites become scarcer and more sophisticated in response to regulation; the liabilities associated with hazardous releases in the environment under the federal and many state Superfund statutes; and the general expansion in consumer awareness and consequent economic behavior toward industries with an "environmentally friendly" image. All of these incentives should be supported by governments and the private sector.

Congress and state legislatures should improve the incentive for industry to take the lead on this program by expanding reporting requirements under Section 313 of SARA (TRI) to include the full range of chemicals that could potentially pose risks to the environment and public health and to more manufacturing categories, whose activities pose similar risks. (There is disagreement regarding expansion to nonmanufacturing categories.) Such an expansion should be designed to increase the incentives for effective pollution prevention planning.

Water Quality 2000 recommends that a collaborative effort be made to establish national guidelines that comprise a general list of components for facility-level pollution prevention plans. These plans should be designed for demonstration of continuous improvement and allow for facilities to revise voluntarily their manufacturing and other processes to reduce inputs of hazardous chemicals and substitute less hazardous chemicals in internal processes to reduce exposure and emissions of those process chemicals and residuals in every step of facility operation and maintenance. As reductions in exposures and emissions are achieved, additional percentage reductions will decrease over time, while continuous improvement in pollution prevention would continue.

Mechanisms must be established to ensure that facilities complete pollution prevention plans consistent with these guidelines. One mechanism could be using the Pollution Prevention Act of 1990 to require the completion of pollution prevention plans consistent with the national guidelines for those facilities covered by the annual TRI report under Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA).

Facilities would make a summary of the resulting plans available to the public. The actions taken as a result of plans need to be reviewed with the affected community and be made available to employees and the public. The level of attainment of the goals described in the plans should be presented to the community regularly to assess progress made under the programs.

health and the environment. Both individual corporations and industry associations must, therefore, take an active role in demonstrating to the public and the legislatures that such a voluntary program can be effective.

Even with the best efforts at pollution prevention planning, however, we will continue to use products and materials that may cause harm to human health and the environment. Such harm can be reduced through proper product stewardship. Product stewardship supplements but does not replace pollution prevention.

Product stewardship is a system for using and managing products through all stages in their life cycle in a manner that continuously improves protection of human health and the environment. The process applies to both new and existing products. It begins with research and development and continues through commercialization, disposal, and environmental fate.

Product stewardship is shared responsibility that covers all stages of a product's life. This includes full consideration of methods to increase protection of human health and the environment in terms of: raw materials use, storage and transportation; manufacturing processes; providing a safe and healthy workplace; packaging; product use and transportation; and educating product users about safe and efficient use and disposal.

Decisions about Products

Water Quality 2000's third recommendation recognizes that there are institutional constraints on the ability of individual firms to make decisions based on potential harm to society and the environment as a whole rather than the economic well-being of the firm, particularly when faced with strong market competition.

The government should intervene by restricting or prohibiting the use, manufacture, or generation of residuals of hazardous chemicals where sound scientific information indicates the need for such actions. As a first step, it may be wise to conduct such intervention using existing mechanisms, such as the Toxic Substances Control Act and the Federal Insecticides, Fungicides, and Rodenticides Act. There clearly is disagreement, however, over the effectiveness of both of these mechanisms and whether improved standards and procedures are needed for these decisions.

Finally, and in support of the other recommendations, a national effort is needed to develop and refine life cycle assessment for products, materials, feedstocks, and the like. Such analyses, if conducted in scientifically valid manner, will enable businesses to identify opportunities for improvements in the water quality area. Such analyses also are useful to identify potential areas of improvement for air emissions and energy expenditures.

Individual and Collective Responsibility for Water Resources

Water Quality 2000's Vision and Goals can only be realized if the American people as individuals and collectively as members of the community adopt a heightened sense of responsibility for protecting water resources. Much can be accomplished through individual and collective responsibility for actions that affect water resources.

Unfortunately, however, experience has shown that purely voluntary action alone will not always ensure that behavior is changed sufficiently. For example, many people and all levels of businesses (from small farmers and retailers to agribusiness and major manufacturers) want to alter their actions to protect the environment but lack the financial resources to do so. Some will change their actions for altruistic reasons, while others require some incentive to do so. Others would act to protect the environment but lack adequate understanding of how their activities affect the environment and knowledge of how to change their behavior accordingly. Invariably, some people and businesses will require more than incentives and education to take responsible actions. The following types of actions will help ensure individual and collective responsibility for protecting water resources:

Education. All levels of government, the media, and academic institutions can help to educate individuals and businesses about how their actions may degrade water quality and aquatic resources and what actions can be taken to reduce or eliminate those impacts. Government agencies, environmental groups, and others have developed resource materials to educate businesses and the public, but much more is needed. School curricula at all levels should be revised to educate the public about environmental issues and effects and, specifically, to teach sound practices in business and everyday life that will help to protect the environment. All levels of government should increase resources devoted to public education, both about general environmental issues, and about specific practices that individuals and businesses can take to protect the environment.

Consequently, we call on Congress to fully fund and expand (as recommended in Chapter III of this report) environmental education programs at all levels: elementary schools, high schools, vocational schools, colleges, professional organizations, government training programs, public libraries, non-profit conservation organizations, farm cooperatives, and so on.

Incentives and Financial Assistance. Often individuals and businesses want to make changes that would protect the environment but lack the financial resources to do so. For example, a homeowner may understand that insulation will reduce energy use and accompanying environmental impacts or that more efficient plumbing fixtures will save huge amounts of water. These investments will save money over time, but the homeowner may lack the capital to purchase and install materials now. Businesses may want to alter practices to reduce their use of hazardous materials and waste generation, protecting themselves and their workers as well as the environment, but require expensive plant changes to do so. Government can help to encourage these practices by revising federal, state, and local tax laws to provide tax credits and deductions for investments in environmental improvement. Small businesses can be helped further by expanding and modifying small business loan and cost-sharing programs.

Facilitation. Often individuals and businesses want to take actions to protect the environment but cannot physically or financially do so alone. For example, individuals, farmers, and small businesses may want to ensure that their relatively small quantities of hazardous waste do not collectively pollute surface and ground water, but facilities are not available for proper disposal at a reasonable cost. Government should fill this gap by working with the private sector to assure adequate, accessible facilities for collection, storage, and disposal of these wastes. Similarly, people and business may want to recycle their wastes, but municipal and regional collection facilities require significant expansion to allow full use of this potential resource. Others may want to make use of valuable recycled materials, such as clean biosolids from sewage treatment, properly-treated sewage wastewater rich in nutrients, and compost from municipally collected household yard waste, but to facilitate this use, government needs to implement and enforce programs necessary to ensure that these materials are safe (and to give the public adequate assurance that they are safe) and work with the private sector to provide or coordinate the necessary infrastructure to transport these materials to the proper locations.

Regulation. While in a perfect world all individuals and businesses would take the proper steps to protect the environment based only on the aforementioned three types of measures, many individuals still will not conduct their business and personal activities in ways that minimize impacts to the environment. For this reason, regulation of some activities is a necessary part of governmental efforts to protect water quality and aquatic resources. Indeed, often regulation "levels the playing field" between those who take appropriate actions on their own and those who must be required to do so.

A Watershed Basis For Water Quality Planning and Management

Most natural events and economic activities (with, most notably, the exception of air pollution) affect the quality of water resources principally within watershed boundaries -- delineations of the regional geography within which all precipitation collects in a common waterbody such as a lake or river. As a result, it can be argued scientifically that watersheds constitute the most sensible hydrologic unit within which actions should be taken to restore and protect water quality. This approach provides the framework to evaluate a natural resource problem using a natural systems approach. Watershed planning efforts to date strongly suggest that individual watersheds are the most logical geographical units to use to identify holistic cause-and-effect water quality relationships, link upstream uses to downstream effects, develop reasonable water cleanup plans, target limited resources, and educate and involve the public.

This argument is even more compelling from an historical context. Much of the national water quality effort over the past several decades has relied on standard technologies or management approaches that could be expected to reduce pollution from point sources regardless of their location. As Water Quality 2000's interim report indicates, however, much of the remaining water quality problems across the country are attributable to runoff from agricultural, urban, and suburban lands.

In contrast to the problems posed by a manageable number of point sources, whose discharges have been relatively predictable, the problems associated with runoff are far more

complex. For example, because runoff problems are often related more to individual actions than to single pollutant sources, there are as many different sources of runoff as there are land uses. In addition, both the quality and quantity of runoff depends on local topography and soils, which can change rapidly, and on rainfall, which is highly unpredictable. Under these conditions, solutions based exclusively on a standard national approach seem unlikely to be successful. Controls developed at the national and state levels must be combined with individually developed strategies for unique river basins, watersheds, and collection basins or receiving waters, including most of the nation's estuaries. The watershed approach may be the only sensible way to address point sources and runoff in an integrated fashion.

Moreover, promoting the implementation and funding of protection efforts within watersheds motivates individual action and provides the public reasonable assurance that those asked to pay for clean-up also will be able to enjoy its benefits. Citizens are usually more interested and involved when they can identify with a nearby stream, lake, or watershed area.

Management institutions organized by watershed provide far better opportunity to resolve intergovernmental or interjurisdictional conflicts through collaborative, consensus-based techniques. Local incentive to participate in such processes should be enhanced to the extent that participants can be assured that all are equal in the process and that results will benefit their community.

Moreover, watersheds provide the flexibility to address water quality and water quantity problems and their interaction in the different climatic settings found throughout the nation; water quality-quantity problems in the arid West are far different from those in the Northeast. Thus, watersheds allow for the development of total resource protection plans that are tailored to the conditions in the area of interest.

Watersheds also may define the appropriate spatial boundaries for total environmental and economic planning. Water is one of the keystones for all levels of biological organization as well as all organized economic activity. Ultimately, all activities in or on the air, land, and water can be measured in terms of their effects on water quality, water quantity, or aquatic resources. It seems sensible, therefore, to evaluate the acceptability of environmental protection and economic development activities on the basis of their effects on aquatic resources within the watershed.

Watershed-based management allows for better accountability in protecting water resources. In our interim report, Water Quality 2000 concluded that clean water programs have been less effective than they could be because of a lack of baseline data and statistics related to progress over time. In addition, monitoring efforts have historically focused on water chemistry instead of other indicators, such as physical habitat, flow, and biology. The watershed provides a logical basis for integrated, coordinated monitoring. Data can then be used as a management tool to manage for environmental results by establishing priorities and goals within the watershed, evaluate the success of protection efforts, and focus limited resources on the most effective approaches and actions.

USGS Hydrologic Units provide consistently derived waterbody segments within which watershed-based measures can be implemented. There are four levels of hydrologic units (see Exhibit B): the largest, *regions*, encompass the drainage areas of major river systems. The regions are divided into *subregions*, *accounting units*, and *cataloging units*. This hierarchy provides the flexibility to address water quality problems at appropriate scales.

Surface hydrologic units may be used to address groundwater issues for some types of aquifers, but not for others. In particular, shallow, unconfined aquifers usually can be managed within surface water boundaries because they are highly connected to surface waters. Deeper, confined aquifers generally cannot be protected effectively within surface water boundaries because these aquifers transgress such boundaries and are not well connected to surface water. Groundwater protection is an integral part of holistic watershed planning. Recognizing that aquifers do not always follow watershed boundaries, watershed institutions should create ways to plan for protection of groundwater resources that cross watershed boundaries.

In some watersheds, planning and management activities may be more effective in attaining water quality goods if they are organized by ecological regions (sub-watersheds). This is because the natural differences in climate, geology, soil, land form, and vegetation may not conform strictly to hydrologic regions. These features can determine the ecological character of surface water and near-surface groundwater.

Under EPA and state leadership, amendments to the 1972 Clean Water Act have resulted in several useful models of *watershed planning*, but little progress has been made in the area of *watershed management*.[10] States, too, are recognizing the need to manage their natural resources on an increasingly broader scale. Today, some 36 states support regional or river-basin approaches to natural resources management.[11] Typically these efforts are designed as consensus-based policy making or planning processes where the states facilitate the creation and implementation of integrated land use, development, and conservation goals in cooperation with local public and private interests. Yet, most states would probably agree that their administrative and political structures may have to change to better support comprehensive natural resources management.

Such change cannot be successful without a parallel reevaluation of federal water quality, natural resources, and related statutes as well as the programs they engender. The 1972 Clean Water Act called for the development of areawide waste treatment plans (Section 208). These regional plans were expected to coordinate all surface and ground water quality initiatives under a management strategy to control or treat industrial and municipal point sources, agricultural and urban runoff, silviculture, construction, mining, saltwater intrusion, runoff from solid waste sites, and accumulated sources of pollution such as deposits in harbors.[12]

21 WATER-RESOURCES REGIONS

EXHIBIT B

Despite a relatively comprehensive design and the expenditure of millions of dollars in federal funds, the Section 208 planning process failed to attain its goals. Over time, regulators and engineers were able to achieve significant improvements in some bodies of water by controlling point sources, but planners were unsuccessful in convincing decision makers to address the full range of sources. This failure is attributable to program delays, resulting, in part, from a lack of EPA guidance that put the planning process out of synchronization with the construction of facilities; federal funding priorities that favored installation of point source controls in advance of planning; and state and local government resistance to using the 208 process for land use control. Yet, a 1976 report prepared for the National Commission on Water Quality stated that:

> "Any effective strategy for control of nonpoint sources within the framework of the Act can only be a product of the areawide planning process."[13]

Areawide water quality management may have been ahead of its time in 1972. Today, after 20 years of experience with narrowly targeted authorities, technology-forcing regulations, and patchwork programs, we believe the nation is ready to embrace a more holistic approach. The challenge this time will be to move beyond planning and actually implement integrated, watershed-based protection of water resources.

Recommendations[14]

Congress should create a new national program of watershed planning and management, including a mandate for implementation of activities as a condition of participating in planning. Congress should impose no particular management form on the states and should build upon existing watershed mechanisms. However, planning and management institutions should be required for all 21 of the major riverine watersheds in the United States. Where watersheds fall entirely within state boundaries, intrastate management institutions may be appropriate. Where water resource systems extend beyond state boundaries, Congress should encourage, authorize, and approve the creation of interstate regional mechanisms, including joint federal-interstate compacts, as requested by the states, to plan and manage water resources. New planning and management institutions should be created with care -- on the basis of water quality priorities and expressions of local interest and commitment.

These new public jurisdictions must be empowered to undertake the range of functions necessary to achieve coordinated use and conservation of water resources. Intrastate and interstate water resources coordination institutions should be:

(1) established pursuant to negotiations among participating parties,

(2) independent, within the context of the broader hierarchy of watersheds,

(3) attentive to the concerns of all affected levels of government and public and private interests,

(4) financed, to the extent possible, by parties to the agreement,

(5) empowered to take effective action within the scope of responsibility agreed to, and

(6) directed by parties of the agreement.

Watershed planning and management institutions should be nested, reflecting the multiple orders of progressively larger watersheds. Institutions created to manage the smallest watersheds (corresponding to one of the 2,150 USGS cataloguing units) should participate in planning and managing the larger watersheds to which they belong and targeting priority areas within watersheds for action. For example, in areas experiencing nitrate contamination from feedlot runoff, states should work with agricultural interests and other specialists from USDA or EPA, as appropriate, within the appropriate cataloguing unit to identify priority sources and take steps to prevent future runoff problems by implementing farm-level pollution prevention plans. Such an action should be undertaken even for small agricultural operations (below the 1,000 unit cutoff for permitting) in areas experiencing water quality degradation.

Such a nested hierarchy could be organized at the top with an umbrella planning institution representing each of the 21 major riverine watersheds, the largest of the watershed divisions in the United States.

Under such a hierarchy, it may be logical to expect that relatively more planning and less management will occur at the largest watershed level. To the extent that federal-interstate jurisdictions are created, for example, they may be well suited to setting performance goals, coordinating the activities of signatory states and their jurisdictions, handling disputes, and raising revenues for implementation. More localized watersheds are probably better suited to sponsor hands-on resource protection, conservation, and use activities, consistent with local goals and preferences. Local management plans must reflect the unique characteristics of the watershed, including those that affect the hydrologic cycle (precipitation, runoff, groundwater percolation, and evapo-transpiration), topography, soils, land use, socioeconomics, and institutions. At the same time, however, plans must take a systems perspective by developing a comprehensive water resources management program that includes water supply, water quality, water conservation, flood protection, land use, and protection of living resources and their habitats.

Watershed management efforts, even at the largest scale, may have to turn to the federal government for activities in which there is a clear advantage to a federal role. Obvious examples include setting national water quality criteria and effluent guidelines as well as drinking water standards. The federal government alone can coordinate the federal agencies to improve collection and dissemination of water resources data. Another is the research and development of effective tools for watershed planning -- ie. risk assessment or methods for valuation of environmental resources. Federal assistance in funding may also be warranted).

All of the recommendations on pollution prevention planning and implementation presented earlier in this chapter can and should be implemented locally, under a watershed planning and

management framework. Other specific actions, including those presented next, also are well suited to a watershed approach.[15]

Water Quality-based Permitting for Point Sources. Despite the consensus that runoff is the source of many of the nation's remaining water quality problems, a significant number of waterbodies do not meet water quality standards because of problematic point source discharges. Under such conditions, water quality-based permitting should be implemented at the watershed level. Refocusing national attention on the need to plan for and manage our water resources within watershed boundaries will help broaden the use of existing authorities to undertake water quality-based permitting and sharpen the need for new authorities and analytical tools. For example, the Clean Water Act currently provides delegated states and EPA regions, where appropriate, ample authority to implement water quality-based permitting. Many critics of the current program have found it to be underimplemented, however. Watershed-based planning will facilitate water quality-based permitting and balance the strategy of "ratcheting down" on point sources with strategies of preventing polluted runoff from rural, urban, and suburban lands.

Coordinate Land-Use Planning with Watershed Goals. Water resource goals cannot be attained without adequate land use planning. Under a hierarchical watershed planning and management system, government must manage land use and transportation systems as one way to attain water resources performance goals. This will entail several activities: (1) planners, private developers, local water districts and boards, transportation agencies, citizen representatives, and owners/operators of water resources management structures must participate in watershed planning and management; (2) watershed management institutions, in turn, must educate these participants on watershed goals and on the links between land use and transportation actions and decisions and the quality of water resources; (3) these participants must carry the message to their constituencies, working toward locally acceptable land use and transportation decisions that protect aquatic ecosystems; and (4) all participants must contribute to improved long-term monitoring and compliance strategies.

Manage Water Delivery Systems within Watershed Boundaries. Under guidance to be developed by the U.S. EPA, with input from the entire drinking water community, states should take the principal role in working through watershed management institutions to shift away from water delivery according to political boundaries and toward more efficient, watershed-based delivery systems. EPA's guidance must address removal of legislative barriers that set incorrect boundaries and prevent management efficiencies on both water quality and quantity issues. The guidance should lay the foundation for states to consolidate proper management (including logistics, administration, and technical support) of water systems (including private wells) through a mix of enforcement and incentives, while encouraging privatization and other options as an answer to financial problems. Guidance should promote adequate education so that the public will support required changes and any related costs. This document should not direct any state action; however, it should strongly suggest action within a set schedule, while using examples of success and offering some incentives for action. EPA and the states may wish to review the recent experience of the state of Washington in this area as a model for the nation. With the lessons learned in the Washington case, it is hoped that full implementation can be accomplished within 10 to 15 years. This is a long-term solution with the guidance document

being a realistic first step. At various points in the time schedule, progress must be evaluated and adjustments made as conditions warrant.

Manage the Hydrologic Regime within Watersheds to Support Habitat and Protect Potable Water Sources. Watershed managers must consider the extent to which both high and low flow conditions can be managed to alleviate ecosystems stresses and support habitat. Where low flow augmentation is sensible, for example, watershed management institutions should adopt augmentation policies, educate water users as to their importance, and oversee their implementation. Regions in which low flow augmentation may make sense generally are characterized by multipurpose reservoirs and structures located either on-stream or off-stream (pumped-storage reservoirs). Incorporation and/or use of water storage capacity within reservoirs for low flow augmentation could significantly reduce stresses on aquatic ecosystems and ensure sufficient supplies for human consumption. Under extreme low flow conditions, relatively small increments in flow volume through flow augmentation can have major impacts on both physical and chemical characteristics of streams, benefiting aquatic ecosystems.

Manage Range and Pasture Lands within Watershed Boundaries. In watersheds where water quality standards are violated or at risk of being violated, because of rangeland runoff or other riparian degradation from grazing, state lead water quality agencies in coordination with federal agencies, ranchers, and others should oversee the planning and implementation of technology-based management measures that serve the goals of the entire watershed. Implementation should occur at the sub-watershed level, at a spatial scale as small as necessary to allow for targeting by the severity of the problem. Implementation should be iterative and progressively more stringent until watershed requirements are met. Monitoring should be carried out by states and local units of government at an intensity sufficient to identify water quality and aquatic system problems. This information should enable resource management planners in assisting land owners and managers to plan and apply economically achievable levels of land treatment and management to meet water quality and aquatic and riparian habitat quality needs.

Riparian systems have the concluding impact on water moving through the watershed. They collect, filter, cool, store, slow, and process runoff in important ways. When properly functioning, riparian systems exert a strong influence on stream flow, water quality, and the aquatic community. Riparian systems that have proper vegetative cover (ecological status) and structure exert the most positive impacts. Therefore, managing riparian systems must be a priority.

Manage Developed Urban Areas Using the Watershed Approach. The first two priorities in any urban runoff program (including CSO abatement) should be: (1) prevention of the storm flows that cause habitat destruction from extreme hydrologic conditions and (2) prevention of the influx of chemical pollutants into stormwater that cause urban water pollution.[16] Storm flow abatement can be accomplished by maximizing upland capture of runoff and, wherever possible, maximizing the infiltration of this runoff into the ground to minimize the need to carry and treat surface flows. Urban watershed managers should evaluate a wide range of activities, including: (1) comprehensive inventories of the number, location, and nature of discharge of CSO and storm sewer outfall points; (2) prevention and control programs for runoff and CSOs on a watershed-wide, multi-government cooperative basis; (3) local citizen

involvement to help frame and fund formal cooperative programs between local and state agencies and citizen water quality activists; and (4) geographic information systems to pinpoint problem areas -- the concentrations of uncontrolled impervious surfaces -- that contribute the most runoff to the sewer systems.

Historically, national water resources policies have established concepts of state primacy, which have further been reinforced by U.S. Supreme Court decisions. Various forms of the appropriations doctrine of Water Law are in place in the 17 western states and have also been reinforced by state water courts. Hence, it will be important for a new national water policy based on watershed level planning and management to take into consideration state water laws and, where appropriate, address the need for state appropriation doctrine to maintain natural in-stream flows. Interstate and interbasin water law, including groundwater law, is perhaps more properly administered by federally enforced compacts.

SUMMARY

This chapter has called for a new agenda in national water policy. The foundation for our new agenda is perhaps best expressed as Water Quality 2000's goal: to develop and implement an integrated policy for the nation to protect and enhance water quality that supports society living in harmony with healthy natural systems.

The first step toward meeting this goal is to articulate holistic water policies to guide our activities in the 21st century. Water Quality 2000 has suggested three strategies for consideration: pollution prevention, individual and collective responsibility for water resources, and watershed planning and management. Detailed recommendations designed to integrate these strategies with related societal policies are presented in Chapter III.

Chapter III presents 85 detailed recommendations -- the tools of change -- that deal with education, incentives, finance, management, regulation, and training. Each is tied intimately to this chapter's broader call for a new agenda for national water policy.

ENDNOTES

1. Much of the discussion in this box is adapted from Theodore M. Schad, "Past, Present, and Future of Water Resources Management in the United States," which appeared in *Water Management in the 21st Century*, American Water Resources Association (September 1989).

2. See, for example, U.S. Environmental Protection Agency, *Environmental Investments: The Cost of A Clean Environment*, Office of Policy, Planning, and Evaluation, EPA-230-12-90-084 (December 1990).

3. Pollution Prevention Act of 1990, P.L. 101-508 (November 5, 1990).

4. National Association of State Foresters, *Report of Survey Results -- Implementation of Silvicultural Nonpoint Source Programs in the United States*. Compiled by Don Essig, Forestry Division, Montana Department of State Lands, Helena, MT (February 1991).

5. U.S. Office of Technology Assessment, *Improving Automobile Fuel Economy: New Standards, New Approaches* (October 1991).

6. Recycling aluminum, for example, reduces air pollutants by 95 percent compared to producing virgin aluminum. Producing glass from scrap glass as opposed to raw materials reduces air emissions by 20 percent and water pollutants by 50 percent.

7. Water Quality 2000 Aquatic Ecosystems Challenge Group, Recommendations from the Citizen Action Subgroup (August 1991). (Complete citation will be included in final report.)

8. For more information, see *America's Energy Choices: Investing in a Strong Economy and a Clean Environment*, Union of Concerned Scientists, Cambridge, MA (1991).

9. U.S. Environmental Protection Agency, Toxic Release Inventories (1987, 1989).

10. The basinwide, geographically focused Chesapeake Bay and Great Lakes initiatives are examples of multiple levels of government and the private sector working together to plan and manage multi-disciplinary water quality improvement initiatives. The Clean Lakes Program, Section 314, has demonstrated how federal, state, and local partnerships can target critical problem sources and effect solutions for over 100 lake watersheds. The National Estuary Program, administered under Section 320 of the Clean Water Act, also brings together all interests in water resources management within designated estuaries of national significance. To date, whole estuary planning and/or implementation efforts have been started for 17 estuary or coastal systems.

11. South Carolina Water Resources Commission, *State River Basin Management Approaches and Consensus Building Techniques*, prepared for National Oceanic and Atmospheric Administration, National Ocean Service (February 1991).

12. Senate Committee on Public Works, "A Legislative History of the Water Pollution Control Act Amendments of 1972," 93rd Congress, 1st Session, Volume 1 (1975).

13. National Commission on Water Quality, "Staff Report to the National Commission on Water Quality," Washington, DC (1976).

14. In preparing this section, Water Quality 2000 relied heavily on a series of recent reports on water resources planning and management. For a fuller discussion of the findings of these reports, see "Watershed Planning and Management," a background paper by Apogee Research, Inc., for the Steering Committee of Water Quality 2000 (November 25, 1991).

15. These are just a few of the types of actions that should be implemented within watersheds. Readers are referred to Chapter III for many other recommendations that are well suited to a watershed approach.

16. All urban watershed managers may wish to consult the *1990 Puget Sound Stormwater Management Manual*, which contains many category-by-category pollution prevention concepts and practices for different industries, businesses, and urban land uses.

The Nature Conservancy

FACTS

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Arlington, Virginia 22209

Contact: Communications Department
(703) 841-4897

BACKGROUND INFORMATION
1992

The Nature Conservancy preserves plants, animals, and natural communities that represent the diversity of life on Earth by protecting the lands and waters they need to survive. Operating in the United States for the past forty years, the Conservancy also has Latin American, Caribbean, and Pacific Programs that have helped protect millions of acres outside the United States. The Conservancy owns and manages more than 1,300 preserves throughout the U.S., the largest private system of nature sanctuaries in the world.

The Conservancy works by;

* **Identifying** lands that shelter the best examples of natural communities and species; determining what is truly rare and where it exists.
* **Protecting** habitats and natural systems through acquisition by gift or purchase; assisting government and other conservation organizations in their land preservation efforts.
* **Managing** more than 1,300 preserves using staff and volunteer land stewards; encouraging compatible use of the sanctuaries by researchers, students, and the public.

ORGANIZATION

The Nature Conservancy was incorporated in 1951 for scientific and educational purposes. It is a nonprofit, tax exempt corporation under section 501(c)3 of the Internal Revenue Code and is a publicly supported organization as defined in Sections 170(b)(1)(vi) and 509(a). The Conservancy's activities are made possible through individual and corporate contributions, foundation grants, membership dues, and recovery of expenses.

The Conservancy has an open membership policy and an elected board of governors. In addition to its volunteers, the Conservancy employs over 1,000 professional staff members with backgrounds ranging from systems ecology, biology, and forestry to real estate, business, and law.

The Conservancy's headquarters are located in metropolitan Washington, D.C., also headquarters to the International Program office. Professionally staffed offices are located in all 50 states.

The Nature Conservancy has expanded its programs to encompass areas outside the United States. The Pacific program, headquartered in Hawaii, is working to identify and protect threatened areas in Indonesia, Melanesia, and Micronesia. In Latin America, the Conservancy has joined forces with over 30 organizations covering 17 countries to provide infrastructure, community development, professional training and long-term funding for legally protected but underfunded areas throughout the continent.

IDENTIFICATION

State Natural Heritage Inventory Programs, usually administered by a state agency, are ongoing inventories that identify rare natural elements and their locations within a particular state. Researchers use inventory techniques and assessment methods developed by The Nature Conservancy. The scientific information gathered by the inventory indicates the relative rarity of plant and animal species, aquatic and plant communities, and other significant ecological features. The systematic inventory process also indicates which natural elements are currently protected and which are not. Consequently, the data can be useful in guiding development siting decisions, in resource planning, and in many other conservation initiatives. In Latin America, these inventory programs are called Conservation Data Centers.

PROTECTION

A project is undertaken based on:

* natural heritage program inventory that identifies a specific site sheltering critically threatened plant or animal species/communities,
* or an acquisition strategy designed to enlarge an existing sanctuary according to priorities indicated by the heritage program.

The project is first reviewed by the Conservancy's senior management. If it clearly supports the Conservancy's mission, a purchase option is negotiated. Upon approval, money for purchase is made available from the Conservancy's revolving Land Preservation Fund. The state chapter or special committee then raises funds to repay the Conservancy so that the money can be reinvested in other protection projects.

In addition, the Conservancy employs a host of other techniques, including conservation easements and voluntary landowner agreements. The Conservancy also works with a variety of public and private agencies and organizations to protect critically endangered lands.

STEWARDSHIP

The Conservancy's Stewardship staff and volunteers maintain more than 1,300 preserves and employ techniques like prescribed burnings, reforestation, fencing and other duties that both maintain the preserves and encourage the growth of endangered plants and animals that live there. These preserves range in size from less than one acre to more than 324,000 acres. Actual management is carried out by the volunteer committees and professional staff after a long term management plan has identified stewardship needs. Most Conservancy preserves are open for educational uses and recreation such as hiking, nature study, bird watching and photography.

STATISTICS:

ACRES PROTECTED IN THE U.S. SINCE 1953:	6.2 Million
ACRES PROTECTED OUTSIDE THE U.S. WITH TNC ASSISTANCE:	20 Million
ACRES MANAGED:	1,300,000
MEMBERSHIP:	645,000
CORPORATE ASSOCIATES:	678
PRESERVES UNDER CONSERVANCY MANAGEMENT: (each preserve may be composed of a number of land conservation projects owned in fee or protected by conservation easements)	1,300
NATURAL HERITAGE INVENTORY PROGRAMS AND CONSERVATION DATA CENTERS:	82

The Nature Conservancy

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Stewardship

The Nature Conservancy works to save rare species by protecting the wild lands they need to live As owner of the largest private nature preserve system in the world, the Conservancy is responsible for the long-term management of over 1,200,000 acres in more than 1,600 preserves. Stewardship of the land safeguards the species and natural communities for which these conservation areas have been established.

Stewardship actually begins prior to any land purchase. A team of ecologists, biologist, zoologists and professional land stewards evaluate the land, determing whether or not satisfactory protection of species can be established within the preserve boundries. If so, the land is set aside and a comprehensive stewardship plan is developed which specifies the best land protection strategy. Depending on the individual preserve, customized stewardship activities may include some or all of the following land protection techniques:

- Biological Monitoring -- An ongoing inventory of life on the preserve is taken by a scientific work force. This biological information provides a cummulative database from which scientists can study the status of a species, as well as generate a method to extend the community.

- Prescribed Burning -- Preserves which require fire to facilitate life of the ecosystem are periodically burned. Specially trained fire management teams study the weather and fuel conditions and conduct extensive field-tested research. The result is safe and effective burning that achieves specific aims, such as removal of old vegetation and non-native species.

- Restoration -- In order to restore some preserves to their original state, native trees are planted by the stewardship teams. Once the trees have regained a hold in the ecosystem, wildlife that depends on the trees can return, restoring the entire ecosystem to its original state.

- Removal of non-native species -- Feral plant species can invade a natural area and choke the native plant life. The stewardship program monitors non-native species and removes any that are dangerous to the ecological balance of the preserve.

Stewardship involves many duties that both maintain the preserve and encourage the growth of the endangered plants and animals which live there. Volunteers play a key role in the success of any stewardship plan. Their enthusiasm and manpower are an invaluable resources which assist the land stewards in all aspects of land management, from fence-building to bird and fish monitoring.

The Stewardship Program is funded by the Conservancy's state field offices as well as the national headquarters. Almost all of Conservancy preserves are open to the public, though it is a good idea to contact the appropriate state office to find out about any regulations before visiting a preserve.

For further information, contact the Stewardship Department at (703) 841-5346.

The Nature Conservancy

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NATURAL HERITAGE PROGRAM & CONSERVATION DATA CENTER NETWORK

Natural Heritage Programs (NHPs) and Conservation Data Centers (CDCs) are continually updated, computer assisted inventories of the biological and ecological features and biodiversity preservation of the country or region in which they are located. These data centers are designed to assist in conservation planning, natural resource management, environmental impact assessment and planning for sustainable development.

The Network: Where are The NHPs and CDCs
There are now 82 data centers operating in the western hemisphere including all 50 U.S. states (most are called Natural Heritage Programs), several U.S. Bioreserves and National Parks, Puerto Rico, two Canadian provinces, and 13 countries in Latin America (CDCs) and the Caribbean. Regional centers provide administrative and technical support to the individual programs.

Each data center is established within a local institution, most frequently as part of a government agency responsible for natural resource management and protection. While individual centers are under local control and are staffed by local scientists and conservationists, they also operate within a network. Tasks that only need be done once for all the CDCs and Heritage Programs, are apportioned to one unit with the results shared throughout the network.

Methodology: How the NHPs and CDCs Work
Each data center uses the Biological and Conservation Data System as the basis for its operation, a system developed and refined by The Nature Conservancy over the past 15 years. The information is managed in more than 30 interrelated computer files, supported by extensive map and manual files, and a library. A trained staff of biologists, natural resource specialists and data managers interprets the data for use in local conservation and development planning, natural resource management and environmental impact assessment.

Information assembled and managed by data centers focuses on: ecosystems and species, their biology, habitats, locations, conservation status and management needs; managed areas such as National Parks, Forest Reserves, and watersheds; and on data sources.

Each center compiles information from existing sources such as scientific literature, knowledgeable people, and museum collections. The local staff also directs and conducts field

inventories of species and natural communities of special concern, or may be contracted for biological assessments of specific sites. Each study and report benefits from earlier work in the same area and, through the network, related information gathered at other times and places multiplies the local effort. Central network databases are supported through cooperative agreements with academic and scientific institutions.

The Nature Conservancy's Role
The Nature Conservancy is involved in the establishment and operation of the CDCs by providing technical, scientific and administrative support and training. The Conservancy also makes available the computer technology, data inventory and management methodology, and procedure manuals used by CDCs and Natural Heritage Programs. The methodology constantly undergoes improvements as part of the partnership between the data centers and The Nature Conservancy. These continual advancements ensure that the entire network remains responsive to the needs of the conservation and development communities.

All told, there are over 300 biologists and computer technicians dedicated to the combined effort, with several hundred others working part-time on biological inventories and research. The Nature Conservancy is the administrative center of this network, promoting communications and the exchange of data, solutions and expertise throughout the network.

Applications: How NHPS and CDCs Are Used
Conservation Planning: The data center's integrated biological and land-use information is used to identify critical areas in need of protection, and to establish conservation priorities on a regional, national and global basis.

Development Planning: To help facilitate design and implementation of ecologically sound development projects, data centers provide biological and ecological information to multilateral development banks, bilateral development agencies, corporations both multi-national and local, as well as in-country governmental agencies.

Park and Protected Area Management: Wise stewardship of natural areas requires detailed knowledge of sensitive and endangered biological features. Information maintained by Heritage Programs and CDCs on parks, forest reserves, and wild areas, and the management requirements of their biological elements, is used to improve management practices.

Research and education: Results from each center's inventory work guides new basic applied scientific research. The biological databases represent an important resource for long-term environmental monitoring.

For more information contact the Science Division (703) 841-4888.
May 1991

NATURE CONSERVANCY BACKGROUNDER FOR EPA/KAREN FISHLER

PUBLICATIONS DEPT. 703-247-3749/4-10-92

While many environmental groups take an adversarial approach, especially to government, in their quest for conservation results, The Nature Conservancy, an international nonprofit based in Arlington, Virginia, looks for partners in its efforts to preserve biodiversity.

The group has worked with numerous federal agencies, as well as countless other public and private partners, to identify and preserve natural areas needing protection. Federal partners with which the Conservancy has accomplished conservation goals include the Environmental Protection Agency, the Department of Defense, the Bureau of Land Management, the Fish and Wildlife Service and the Forest Service.

The Conservancy's mission is to preserve plants, animals and natural communities that represent life's diversity by preserving the lands and water they need to survive. In the decades since its founding in 1951, the Conservancy and its members, who now number approximately 640,000, have been responsible for the protection of more than 6.2 million acres in 50 states and Canada. It has helped like-minded nongovernmental partner organizations to preserve millions of additional acres in Latin America and the Caribbean.

Over the years, the Conservancy has built a reputation as a quiet force in conservation, often purchasing land in order to

preserve rare and endangered species. Besides fee acquisition, the Conservancy uses conservation easements and voluntary landowner agreements to ensure habitat protection. Some Conservancy-acquired areas are transferred for management to other conservation groups, both public and private. But the Conservancy owns more than 1,300 preserves -- the largest private system of nature sanctuaries in the world. Stewardship staff and volunteers who maintain the preserves employ techniques like prescribed burnings, reforestation and fencing to protect, and encourage the growth of, endangered plants and animals.

Science-based since its inception, the Conservancy developed the methodology now used by Natural Heritage Programs (NHPs) and Conservation Data Centers (CDCs) -- a network of continually updated, computer-assisted inventories of the biological and ecological features of the country or region in which they are located. There are now 82 data centers operating in the Western hemisphere, including one in each of the 50 states, where they are usually run by state governments (most are called NHPs). The other 32 are located in U.S. Bioreserves, National Parks and National Forests, Puerto Rico, Canadian provinces and 13 Latin American and Caribbean countries (most of these are called CDCs).

The data center network helps the Conservancy's planners decide which areas most need help from the organization, and in which order. The network also responds to more than 200,000 requests each year from governments, educational institutions and industry for information that will help in development planning, natural resource management and environmental impact assessment.

In addition to its headquarters office, the organization has eight regional offices and 60 state offices. Over the last 18 years, the group has developed a strong program in Latin America and the Caribbean, working with partners in 17 countries. Reflecting an increasingly global perspective, the Conservancy last year also established a program in the Pacific.

Building on its accomplishments through direct action, the Conservancy has recently begun placing more emphasis on the need to work with an even greater range of partners, in order to protect ecosystems as well as individual species and communities -- a goal that cannot be accomplished by the Conservancy alone. The organization has called for a conservation approach that will include both people and nature, and last year launched an initiative it calls "Last Great Places." Large-scale bioreserve projects -- an initial dozen were introduced last year, with more than 60 additional sites to come -- are serving as models for the Conservancy's new conservation vision. The projects, which consist of still-intact natural systems that are under threat, typically include a core natural area that should be fully protected, surrounded by a buffer zone where appropriate sustainable development can be encouraged. Government agencies, private citizens' groups, responsible businesses, educational institutions and other conservation groups are among the many partners with whom the Conservancy is working on Last Great Places projects.

The Conservancy is already benefitting from EPA water quality programs -- in wetland and estuary protection planning,

for example, as well as in nonpoint source control -- that conserve habitat and protect biological diversity. The organization is very interested in expanding its relationships and joint ventures with EPA (in most cases this will be in cooperation with the conservation and environmental protection agencies of the states). To this end, Conservancy field office staff expect to meet and work more closely with EPA regional office people.

A special opportunity is presented by the Office of Water's innovative watershed protection approach, a close match for the Conservancy's bioreserve planning approach. In many bioreserves, such as the Cache River of southern Illinois and Big Darby Creek in central Ohio, Conservancy planning is directed toward the comprehensive protection of an entire watershed, its water quality, its natural communities and diverse life. In these cases, in fact, the ecological landscapes that the Conservancy is working to protect have had the advantage of nonpoint source grant funding awarded by EPA Region V to the states of Illinoise and Ohio.

EPA staff wishing to locate Conservancy bioreserve projects in their regions should feel free to call the organization's state offices for information; addresses and phone numbers [are available from News-Notes][appear on page X]. The Nature Conservancy's headquarters office is located at 1815 North Lynn Street, Arlington, Viginia 22209, (703) 841-5300. Overall liaison with federal agencies is provided by John Humke at the Arlington office, (703) 841-8761.

The Bioreserve Concept

Robert E. Jenkins, Jr.
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ABSTRACT

"Bioreserve" is a term used by The Nature Conservancy to refer to areas -- generally large ones -- where conservation of biodiversity can be carried out at the landscape scale. Bioreserves must be large enough to encompass examples of multiple community types that naturally occur and dynamically interact within a region. Such large areas will usually be complexes consisting of multiple real estate tracts under various kinds of ownership but with coordinated management. This paper discusses biodiversity itself, the need to conserve it, the necessity of nature reserves, the Bioreserve concept, and the idea of comprehensive biodiversity conservation planning. The theme of people and nature is a key aspect of the Bioreserve idea -- of making land use patterns and resource management regimes that are compatible with the needs of the biota, both on preserves and on the general landscape. For too long we have behaved as if conservation could be achieved merely by separating nature from people, with detrimental effects on both.

INTRODUCTION

Bioreserve definition

As used by The Nature Conservancy, the term "Bioreserve" means an area large enough to encompass intact examples, in an integrated array, of as many as possible of the ecosystems typical of the geographic region. Within a Bioreserve, the ecosystems must be managed in a way that maintains the primary ecological processes and provides adequate habitat for the survival of the native species that should live there. Wherever possible the Conservancy will select areas that contain habitat for clusters of endangered species and those that are difficult to conserve.

Biodiversity and The Nature Conservancy

For many years the Conservancy has been establishing nature preserves to protect endangered species populations, pristine ecosystem remnants, and other important biological and ecological features. Because many of these preserves are small and challenges from outside their borders are increasing, we must take additional steps to ensure their long-term capability to sustain all of the targeted species and biotic communities. To prevent a gradual loss of species from these preserves

and the consequent disintegration of their communities, we must find ways to enlarge their effective size. In many or most instances, we must also manage them intensively to replicate natural processes that may no longer operate.

Bioreserve antecedents

We propose to do this through landscape complexes of preserved and multiuse lands that we call "Bioreserves." The idea is to arrange for land and resource uses on the non-preserve portions of the complex that will minimally damage and, if possible, actually enhance the status of the biota within the area. The concept of such a multizoned reserve goes back at least to 1892, when the Adirondack Park was established in New York. A similar idea was employed by the British in the 1940s on their "green line parks." The New Jersey Pinelands Reserve is another large-scale application of the concept, and UNESCO's Man and the Biosphere Program has encouraged the establishment of a worldwide network of such reserve complexes, which it refers to as "Biosphere Reserves" (UNESCO, 1974, 1984). Nature Conservancy properties form important parts of several such UNESCO-designated complexes, and the Conservancy's Latin American "Parks in Peril" campaign is attempting to enhance the conservation status of many others. Through its Bioreserve initiative, the Conservancy will greatly increase the fraction of its total efforts devoted to such large-scale projects.

Multiple ownership complexes

Land within a Bioreserve's ecological boundaries will not ordinarily be under single ownership, and much of it will not be managed for strict nature conservation purposes. However, the Conservancy will be undertaking overall assessments of regional ecosystem processes to identify critical threats and indicators of healthy function. Then it intends to use its traditional land-protection tools and work with all willing landowners to help them understand the relationship of their land management to the whole and to develop management and development plans that are compatible with the needs and limitations of the overall system. This approach will not only extend the effective biological habitat to larger land areas but will allow the local community to participate in management and use of the reserves. It will be a special challenge to understand the ecosystem processes well enough to prescribe the correct management treatments. It may be an even bigger challenge to find combinations of sustainable land uses on the multiuse lands that are compatible with both human needs and those of the other biological inhabitants.

Scope of Bioreserve initiative

The concept is an attractive one that promises to contribute enormously to the conservation of biological diversity. For it to do so, a great many complex biological, ecological, legal, financial, and managerial systems must be successfully integrated. Over the next five to ten years the Conservancy intends to apply this concept on a large scale -- increasing the number of Bioreserve projects as rapidly as possible in North America, Latin America, the Caribbean, and the Pacific. Internally we intend to transform the organization in order to develop the skills and expertise we will need for this multifaceted task.

BIODIVERSITY CONSERVATION

Biodiversity values

The Nature Conservancy was founded as a special committee of the Ecological Society of America in 1917 and was established as a separate action-oriented organization in 1946 (Ecological Society of America, 1921, 1926; The Nature Conservancy, 1981). Since its inception, the organization has been completely devoted to conserving biological diversity by establishing nature reserves. It has done this by identifying and protecting land areas containing a wide variety of ecosystems to serve as habitat for the greatest diversity of biota possible.

The destruction of natural landscapes, ecosystems, and species that so concerned the Ecological Society in 1917 has continued and intensified in spite of the helpful effects of the nature reserves. As nature's estate has shrunken away, a larger and larger fraction of the conservation community has turned its attention from traditional interests and begun to join us in focusing specifically on conserving biological diversity. By now an extensive literature has been developed on biodiversity, and the reasons for concern have become familiar (Jenkins, 1975; McAllister, 1991a; Norton, 1986, 1987; Oldfield, 1984; Wilson, 1984). However, it is worth reiterating some of the main points here.

Nature as a Storehouse of Renewable Natural Resources

Applied uses of biodiversity

Renewable natural resources are the basis of all human societies, primitive and modern. In the classic hunter-gatherer economy, low human population densities can maintain themselves in a rough equilibrium with the productivity of their natural surroundings, hunting game animals and gathering roots, berries, and other food plants for their local needs. Higher population densities depend instead on farms, ranches, and orchards as their sources of food, drink, and other biological products, but all livestock and crop plants derive ultimately from the wild biota. New breeds are developed, and old ones improved, through continued exploration and experimentation that depend on the natural landscape for its source materials.

Corn (*Zea mays*), for example, is one of the most widely cultivated food plants in the world, having an economic value over $50 billion. First domesticated by American Indians, corn's wild relatives still exist in Mexico, where one species in particular, the recently discovered *Zea diploperennis* (Iltis et al., 1979), provides novel genes conveying disease resistance and other desirable characteristics to agricultural corn strains. Yet, until Rafael Guzman, a Mexican botany student, discovered this species, its only known stand, a mere 15 acres, had no particular protection from logging, farming, and other diversity-reducing land uses characteristic of the Mexican mountains. Conserving this diploid wild corn was the key factor in establishing a 350,000-acre UNESCO Biosphere Reserve maintaining this species and its many thousands of ecological and evolutionary associates in their natural landscape setting.

Clothing and shelter also depend heavily on renewable natural resources, as does the production of paper, that still-essential component of modern office life. Yet it is in pharmaceutical products that biodiversity really stands out. Humans have consciously been fighting parasites and diseases for only a few millennia, while other species have been evolutionarily fighting each other nearly since time began, leading to countless instances of metabolic substances produced by one organism that inhibit, deter, or outright kill another organism.

Folk medicines throughout all the world's cultures reflect indigenous people's knowledge of plants or plant extracts that appear to combat specific maladies. Many such reports have a scientific basis; with refinement, a purified plant extract can be produced as a drug with known properties. The world's most widely used drug began its theraputic career when people noticed that chewing twigs of willow (Salix) would reduce pain. Dioscorides reports that a decoction of willow leaves was used by the classical Greeks. Fractionated and tested by 19th-century German chemists, willow yielded the chemical called salicin; its manufactured counterpart, acetylsalicylic acid, is now known as aspirin. The heart drug digitalis, from the foxglove (Digitalis purpurea), is another instance of a folk remedy now integrated into modern medicine. Malaria-fighting quinine from cinchona bark, (Cinchona officinalis) was brought to Europe in the 1600s from South America, where the natives had valued it for centuries.

Applied uses, continued

Aspirin can be manufactured economically, because the chemical substance involved is simple and easy to make, but most biologically active plant products cannot be duplicated more cheaply by industry than they can be grown or even harvested from managed wild populations. Simpson and Conner-Ogorzaly (1986) report that 37 of the 100 most-prescribed medicines in America contain active compounds such as steroids or alkaloids derived from flowering plants or fungi.

Taxol, for example, has recently come into prominence as an unusually promising anticancer drug. Its complex formula perhaps evolved as a predator or parasite defense by the yew tree in the days of the dinosaurs, and has not yet been duplicated in the laboratory. Of the world's several species of yew, the Pacific yew (Taxus brevifolia) apparently produces this substance in the greatest concentration. The search is currently on to locate the most productive kinds of yew trees, cultivate these, and begin a taxol-production industry. Until then, demand for this new drug far exceeds the sustainable level of wild harvest of this slow-growing and relatively scarce understory tree of the Pacific Northwest.

Not only survival and sustenance depend on biological diversity, but also much of the enjoyment we derive from house plants, gardens, and landscaping. Plant breeders continually seek new materials, both as native species and as hybrids and selections derived from them. The genetic pedigrees of many of our cultivated orchids and azaleas, to name

just two examples, reach into the natural landscapes of faraway places.

Insects and many other invertebrates -- terrestrial, aquatic, and marine -- have also been evolving complex chemicals for many millions of years, which may prove of immense pharmaceutical value (Myers, 1983). Poisonous fish may also provide new drugs (Segman, 1959).

The economic wealth of tropical biota is only now beginning to be explored systematically, yet in some regions extinction is happening faster than species can be studied even superficially, and far faster than they can be categorized, described, and named. Landscape conservation is the key to protecting the largest number of unknown species, not only for their own sake, but for the future benefit of human society as well.

Nature's Right To Exist

Live and let live

Most of us have a natural moral sense that tells us it is wrong to drive other species to extinction just because we want to consume more and more of the Earth's resources until an absolute limit is reached. The advance of civilization has caused most people and societies to recognize progressively a moral obligation to accord increasing rights to other individuals, other social groups, other societies, and other living entities. Political pressures for humane treatment of animals, for example, are growing rapidly. A number of legal scholars have recently argued that much good would result from recognizing nature as having legal rights such that "trees could have standing" under which lawsuits could be brought in their defense (Stone, 1988).

Some of this extension of rights to others results from the fact that decent behavior makes us feel good, whether from instinct or social conditioning. Some of it is based on the sound expectation that if we deal unfairly with others they will deal unfairly with us. There may also be a simple concept of good management that says unrestrained competition places dangerous strains on a system's stability (see below).

Nature as Essential to the Human Psyche

Psychological values

A written record of humankind's affinity for nature's beauty, harmony, and tranquility goes back to Herodotus (5th century B.C.) in the Western tradition and at least as long in Far Eastern cultures. Nature has been prevalent in the art and literature of all cultures for as long as they have had art and literature. Many people have looked to the wilderness for a sense of freedom. Outdoor recreation, from hunting and fishing to picking wildflowers, has been a source of enjoyment throughout recorded time and in recent years, so-called ecotourism has become one of the fastest-growing sectors of the travel industry. It is sad to think that this represents something of a scramble to visit the last wild places before they are gone, but obviously, the phenomenon is fueled by the inherent love that our species feels for nature (Wilson, 1984).

Sensory deprivation experiments show that the human mind cannot stand the monotony of being cut off from a stream of varied messages about objects and events in the external environment. Almost any human activity we find pleasurable depends in part on diversity, and nowhere is this more convincingly demonstrated than in our response to nature. Few people would go bird watching if there were only one or two species of birds, and it is the rare and seldom-seen ones that are most sought after. The loss of a rare species is always deeply felt, often even by non-biologists who know little or nothing about them. It is instinctive.

Ecological Resilience and Ecosystem Services

Perhaps the best of all arguments for preserving biological diversity is that we don't know whether we can get along without it.

Biodiversity and ecological integrity

A decade ago James Lovelock made the first statement of what he called the Gaia hypothesis (Lovelock, 1979). This complex idea has some very debatable aspects, but it highlights at least one important premise with which experts in many fields increasingly concur -- that the biological inhabitants of this planet have profoundly modified the chemical and physical attributes of the surface and near surface of the Earth through their life processes. We have called the thin envelope around the surface of the Earth and the lower atmosphere the "biosphere," by which we mean that this is the only place we know of where life exists or where the conditions that make it possible can be found. Now we realize that not only does life exist here, but it is life that has largely made the biosphere the way it is.

Conversely, the biota have adapted through evolution to the current environmental conditions, and very few extant biological species, including human beings, could live under the conditions that prevailed on the Earth's surface before life proliferated. Every living thing is dependent on other living things. We cannot be sure what will happen if we disrupt biological processes beyond a certain point or to what degree current planetary function might be dependent on the immense biotic diversity that has evolved over the last couple of billion years. Paul Ehrlich has used an engineering analogy to illustrate this point (Ehrlich and Ehrlich, 1981). Ehrlich says that if someone were in an airplane waiting to take off and observed mechanics drilling rivets out of the wings one after another, that person would begin to be more than a little apprehensive about how many rivets could be removed before the plane suffered structural failure. Extinguishing biological species from the Earth is even worse in some respects, because we do not have even a clear understanding of just what functions given species may be performing. The potential for large consequences from the loss of quite unprepossessing species seems high. Prudence would dictate that we not allow biotic diversity to be reduced in any very marked way.

On a simpler level, the relationship between biological diversity and the stability of individual ecosystems has been debated for many years (e.g., Anonymous, 1969; Goodman, 1975; Hutchinson, 1959; May,

1974; Pimm, 1984). For a long time the question was miscast in conservation circles -- it was implied that more biologically diverse ecosystems should be more biologically stable than less diverse ecosystems and more able to retain their original structure and composition under disturbance. The facts seem to be that very diverse communities, such as tropical rainforests, tend to contain many rare species with narrow and specialized niches that disappear under even moderate disruptions (though they can usually reinvade unless the disruption is severe or prolonged). At the other end of the spectrum, very homogeneous communities, such as crop monocultures, present innumerable empty niches that can be rapidly invaded by aggressive species and thus become more diverse under continuous disturbance. Unfortunately, disturbance seems to favor widespread "weed" species (both animals and plants). Thus, overall biodiversity is reduced as a few species replace many species over a wide geographic range.

It seems apparent to many of us that it is more meaningful to ask whether biologically diverse ecosystems are more ecologically stable in terms like these:

Ecological integrity, continued

> Is a forest stand more likely to experience a much greater loss of the overstory to a pest or pathogen if it is composed of a single tree species than several species? (Monocultures of susceptible species create conditions for unimpeded outbreaks of pests or disease -- Franklin et al., 1989.)
>
> Is it likely that an ecosystem with many species, each of which is exploiting a narrower niche by means of more precise adaptational uses of a subpart of the resource base, will be less "leaky" -- in terms of energy and material flows, soil and water relations, biomass accumulation, and the like -- than an ecosystem with fewer species? (O. Loucks, personal communication).
>
> Are entire landscapes more ecologically stable if they contain many species capable of successfully using the many microhabitats created by spatial and temporal variations than if they contain fewer species and fewer community associations?

The answers to these questions should show that biologically diverse ecosystems are highly desirable and deserving of protection against disturbances that are catastrophic or chronic and produce the above effects.

HOW BIODIVERSITY IS ORGANIZED IN NATURE

For conservation purposes, biodiversity may be thought of as being organized at three distinct hierarchical levels (McAllister, 1991; Office of Technology Assessment, 1987; Reid and Miller, 1989; Salwasser, 1990), as follows:

Biodiversity organisation

1) Genetic diversity. At this level are included all the genes and genotypes found in all individual organisms, important to their own adaptational existence and representing resource options for use by people.

2) Taxonomic diversity (often referred to as species diversity). This level comprises the full array of kinds of plants, animals, and microorganisms that exist in nature. The term "taxonomic diversity" is preferred because it includes the idea that species classified in different higher taxonomic groups, such as families and orders, differ more from one another than species in the same genus (McAllister, 1991); also, that infraspecific taxa like subspecies, varieties, and interspecific hybrids also represent differences that may be worthy of conservation attention.

3) Community (or ecosystem) diversity. Species live together and interact in a great variety of combinations in nature; these combinations differ from each other enough to be recognized as distinct biotic community types including many kinds of forests, grasslands, wetlands, and aquatic assemblages. When abiotic habitat variables are included with the biotic communities, the totality is referred to as "ecosystems" (Whittaker, 1975).

For some purposes, and especially relevant to the Bioreserve concept, it is useful to recognize a fourth level of organization (Noss, 1986):

4) Landscape diversity. All landscapes display subtle or obvious variations in landform, substrate, and disturbance history which favor different community assemblages, so that the total landscape is made up of a patchwork of different community types. Because of broad differences in regional climatic regimes, the typical community assemblages differ from one geographic region to another (Emmanuel et al., 1985; Forman and Godron, 1986).

BIODIVERSITY LOSS AND CONSERVATION

Extinction

Our heritage of biological diversity is being rapidly depleted by the increasing demands human activities place on the environment. Although species extinction has occurred in nature since life arose, it has generally been compensated for by the evolution of new species. We can discern in the fossil record several great extinction episodes, but most experts believe that these really took place at a stately pace by human standards (they only look rapid when compressed into rock strata laid down over millions of years) and that the overall trend has been upward. We believe, therefore, that at the time our ancestors began to walk upright, there were probably at least as many species as ever existed in the Earth's history. Since humanity's fateful rise, however, the trend for other species has been ever downward. The human-caused extinction spasm that we are currently experiencing appears to have begun in many places about

10,000 years ago with the loss of the great Pleistocene megafauna, the woolly mammoths and ground sloths and camel relatives, that we were taught as schoolchildren to associate with the advance of the glaciers (it really happened after their retreat) and has been continuously picking up speed. It is now taking place at a blinding rate.

Homo sapiens appears to have brought about the Pleistocene extinctions directly by overhunting, and this has continued to recent times (Martin and Klein, 1984). Our colonial grandfathers killed off the passenger pigeon, the Russian sealers got the Steller's sea cow, and we almost finished off the American buffalo in the same high fashion. Since the advent of game laws and game management, direct taking has ceased in some parts of the world to be a main cause of extinctions, although unregulated taking of rare plants such as certain cacti continues to be a problem in our own country. Ambient environmental threats, like acid rain and thinning stratospheric ozone, will probably cause the extinction of some especially vulnerable species like lichens on mountain tops, but these forces may threaten humanity as much as they do most other species, so that we may be more inclined not to let these threats become extremely serious.

Habitat destruction

Meanwhile, the overwhelmingly greatest threat to the biota today comes from direct habitat destruction. The destruction of tropical rainforests for agriculture and grazing is much in the news, but other regions and ecosystems are equally affected. Tropical dry forests and grasslands are even more endangered than rainforests. Agriculture continues to expand to more and more marginal lands almost everywhere in the world. Absolute destruction of natural habitats is exacerbated by fragmentation into remnant patches that are subject to severe edge effects -- that is, invasion of weedy species, drying effects on microclimates, increased windthrow of exposed trees, etc. Many of the ecosystem fragments are just too small to support minimum viable populations of various species inhabitants. This fragmentation of North and Latin American habitats is now believed to be the major cause of rapidly declining populations of our migrant birds (Terborgh, 1989).

Watersheds

Aquatic systems are especially vulnerable (Benke, 1990; Karr, 1981; Master, 1990, 1991). Alien species and habitat degradation are responsible for the increasing number of endangered fish and other aquatic organisms. There are at least 167 North American desert fish species that have been identified as endangered, vulnerable, rare, or of indeterminate status. Forty-eight of these are listed as endangered (Desert Fishes Council, 1985). In addition to direct destruction from impoundment, drainage, channelization, water withdrawal, riprap, and the like, they are subject to the run-off of toxic pollutants, silt, and excess nutrients from disruptive forces exerted anywhere in their watersheds (Borman and Likens, 1979). (To fight this, Bioreserves will often be designed around critical watersheds.)

Because habitat destruction is the main threat to biodiversity, habitat protection is the most effective form of conservation action (see section on nature reserves), but this can be (and must be) augmented by protection against direct taking and by the off-site conservation efforts of zoos, botanical gardens, and seed banks. "Ex situ" methods are often expensive, require constant attention, and cannot reliably preserve associated mutualistic species or the evolutionary potential in populations in their natural habitats. Therefore, such methods should be used in close conjunction with land conservation such as in the "integrated conservation" programs promoted by the Center for Plant Conservation (McMahan, 1990) in cooperation with land managers like the Conservancy and the Federal agencies.

NATURE PRESERVES

A systematically developed network of nature preserves and carefully managed multiple-use lands is our only real hope for perpetuating the vast majority of our biodiversity heritage.

Conservancy nature preserves

Since the 1950s The Nature Conservancy has devoted its efforts to establishing nature preserves, mainly through direct acquisition of land, by itself or in cooperation with Federal and State land management agencies. During this time we have carried out more than 11,000 land protection transactions in which we acquired outright over 5,500,000 acres of land. Of these, the Conservancy still owns and manages more than 1,200,000 acres at over 1,600 separate sites, the largest private nature preserve system in the world. The remaining acres have been transferred to other conservation agencies for their management. Mostly these have been Federal and State government agencies, but some lands have gone to other private conservation organizations.

To preserve the widest array of the "elements of biological diversity," the Conservancy has systematically identified and protected lands containing a wide variety of habitat types and species. From the lands identified, our priority has been to work on the rarest, the best, and those that are most threatened. If we had not established these preserves, the features and phenomena they contain would have been destroyed. The complete system of existing preserves, including those established by other agencies, constitutes, in our view, the most important biodiversity conservation action taken to date.

Preserving as much diversity in as many places as possible with limited resources has required that many of the preserves be small, often barely containing the important features themselves, or sometimes only part of them. Such small preserves must be thought of as stopgap measures for many of the species and ecosystem remnants they contain, sufficient to meet their immediate needs but, like lifeboats, not expected to suffice as their entire future habitat.

Effects of Small Preserve Size

Preserves too small

Island biogeographic theory suggests that for a variety of reasons, small preserves, or small habitat patches within preserves, will gradually lose some of the species they originally contained (Diamond, 1975; Diamond and May 1976; Higgs, 1981; MacArthur and Wilson, 1967; Shafer, 1990; Willis, 1974). Considerable empirical evidence shows what common sense would predict -- that there is a correlation between smaller preserves and more depauperate biota (Burgess and Sharpe, 1981; Lovejoy and Oren, 1981; MacClintock et al., 1977; Newmark, 1987). Larger areas are believed to lose species much more slowly than smaller areas and, under ideal management, it is hoped that a large enough area would lose species at no greater rate than the long-term geological rate (that is, species would be lost not faster than other species evolved to replace them).

One of the reasons for species losses is undoubtedly that small habitat patches are not large enough to sustain viable populations of many of their rarer constituent species (Gilpin and Soule, 1986; Shaffer, 1981, 1990; Soule, 1987). On top of that, many species require multiple habitats which smaller preserves cannot include. Some birds, for example, nest in one kind of habitat and feed in another (see, e.g., Wegner and Merriam, 1979). Larger species and those high in the food chain typically have large home ranges and require a great deal of space. To sustain enough individuals of such species in a given area to constitute a viable population may require a great deal of space. This means that from the very date of establishment, smaller preserves simply cannot sustain populations of many species.

Effects of Habitat Fragmentation

Habitat fragmentation

Fragmentation of the landscape by development or serious disturbance produces remnant vegetation patches surrounded by a matrix of a different sort. Lord and Norton (1990) pointed out four major aspects of fragmentation as important for conservation: small fragment size, isolation, edge effects, and increased vulnerability to extrinsic disturbances. Soule (1987) and Saunders et al. (1987) stated that the primary impact of fragmentation on the biota is through loss of habitat continuity, because any disruption of previously intact vegetation has some effect on the population size of species dependent on that habitat. Another serious effect is an alteration of the microclimate within and surrounding the remnant. Thus, in a fragmented landscape there are biogeographic effects compounded by changes in the physical environment (Saunders et al., 1991).

The impact of habitat loss and isolation at a given scale of fragmentation can be considered species-specific, but the physical impacts of edge effects and increased vulnerability to disturbance are much more dependent on the nature of fragmentation itself. The significance of edge effects in geographical fragments has been well documented (Lovejoy et al., 1986; Whitney and Runkle, 1981; Yahner, 1988), with some studies

indicating that edge effects may penetrate for several hundred meters into fragments (Ranney et al., 1981; Wilcove et al., 1986). Because of the substantial internal modifications associated with smaller areas, structurally fragmented vegetation can be regarded as being subjected to edge effects throughout.

The reduction in spatial continuity, together with edge effects, increases the vulnerability of fragmented vegetation to extrinsic disturbances such as windstorm, fire, and flooding. Although the importance of this increased vulnerability has perhaps been less widely recognized, it also has significant implications for the long-term viability of fragmented vegetation (Pickett and Thompson, 1978).

Emphasis in the literature has been on the design of nature reserves, but we are usually too late to do anything except try to manage the remnants left following fragmentation. There is a pressing need for an integrated approach that treats the landscape as a whole instead of as a collection of biotic and legal entities (Saunders et al., 1991). Noss and Harris (1986) state that conservation agencies have not realized the important biological consequences of ecosystem fragmentation and have therefore not developed policies to manage their remnants to maintain conservation values.

Minimum Viable Populations

Viability of species

Where possible, sites should be large enough to support populations of species above the minimum viable population (MVP) size. The MVP refers to the minimum number of individuals required to ensure the long-term survival of the population. Below this threshold, genetic and demographic constraints may pose serious threats to the population's persistence (Murphy et al., 1990).

Critical factors affecting MVP include habitat heterogeneity and suitability, environmental stochasticity, and population structure and dynamics (Grumbine, 1990), all of which may vary with species. As a gross approximation, an effective population size of 500 is considered to be within the order of magnitude essential for long-term viability (Franklin, 1980). Large tracts of land are often required to sustain viable populations of animals such as large herbivores and carnivores. In a study of eight U.S. parks, Newmark (1987) found that none were large enough to sustain long-term populations (MVP=500) of the five major carnivores (grizzly bear, mountain lion, wolverine, black bear, and gray wolf). For an MVP of 50, only one was large enough to support populations of these mammals. Where it is impossible to preserve such large unfragmented reserves, Bioreserve design must provide for an adequate network of connections among smaller reserves across the landscape. Properly managed, connections among smaller fragments may be adequate to sustain viable population of large vertebrates.

Similar connections are also necessary for plants and invertebrates (Shafer, 1990). Although these species generally exist at much higher

population densities, they can also be sensitive to habitat fragmentation. Linkages between subpopulations (termed "metapopulation dynamics") may be crucial to the persistence of endangered species of plants (Menges, 1990) and invertebrates (Murphy et al., 1990). Connections between subpopulations allow for recolonization of a patch after extinction occurs. Similarly, gene flow among patches prevents genetic bottlenecks and genetic drift in small subpopulations. Population substructuring also provides for resilience to extreme environmental perturbations. For such species, the most prudent Bioreserve design strategy is to maintain sufficient habitat patches to reduce the risk of extinction (Shafer, 1990).

Preserve Enlargement and Management Interventions

Preserve enlargement

In many places, The Nature Conservancy has been able to enlarge small preserves by acquiring adjacent lands. At some preserves, such as Chiwaukee Prairie and Mianus River Gorge, The Nature Conservancy has been acquiring additional acreage almost every year for more than 30 years. In many instances such assemblages have been government reserves like Dismal Swamp National Wildlife Refuge or additions to reserves like the Okeefenokee, Yellowstone, or the Everglades. But it is not always feasible to acquire adjacent lands, and it is rare that we are able to make a preserve as large as we would like it to be, even through a drawn-out process of land assemblage.

Intensive management

We have also sought to improve the viability of preserves through intensive management, as in restoration of natural fire or other disturbance regimes, suppression of aggressive weeds, or even hastening ecological succession toward the desired community structure and composition by direct replanting and species introduction programs. As an example, the Conservancy probably uses prescribed burning to maintain or restore fire-dependent biological communities on a larger scale than anyone else except the Federal land management agencies. Such intensive interventions will have to become the rule on smaller preserves if we are to counteract further degradation of the general landscape. With the advent of such pervasive threats to ecosystem stability as rapid global climate change, in many places we simply will not be able to do enough (see, e.g., Peters and Darling, 1984; Thompson, 1988; Webb, 1987).

Corridors as a Mitigative Factor

Restoring connectivity

Corridors are suggested as a means to increase species immigration to nature reserves and other habitat islands in fragmented landscapes, and thus to maintain species richness (Harris, 1984). Corridors include linear landscape features such as hedgerows and river banks, as well as broad, internally heterogeneous zones that permit dispersal of species from one region to another over long periods of time (Brown and Gibson, 1983).

Simberloff and Cox (1987) point out that while corridors are of value for movement for a subset of the biota, there are potential disadvantages such as spread of disease, pests, or fire, increased maintenance costs, and increased predation. The relative merits of corridors will vary from place to place and depend on the target species.

BIORESERVES

Bioreserves are the next natural evolutionary stage in the development of the Conservancy's conservation programs. In many instances they are emerging organically from the cumulative effects of long-continuing efforts. Encouraged by our experiences in these areas, we are elsewhere developing Bioreserve plans from scratch.

Bioreserve concept development

In the natural evolution of things, as the scale of Nature Conservancy projects and preserve assemblies grew over the years, we began to think about conservation on a larger scale. The Virginia Coast Reserve (VCR) was especially influential in our thinking. At the VCR, the Conservancy had created a broken mosaic of protected barrier islands and a few mainland sites stretching more than 50 miles along the mid-Atlantic coast. Our lands totaled nearly 50,000 acres but they were scattered over a land-and-seascape perhaps ten times as large. We began to realize that after the expenditure of many millions of dollars and 20 years of effort, we had created a magnificent but imperfect nature preserve. If the other nine-tenths of the ecosystem were to be intensively developed or abusively used, our own lands would be severely affected. At the same time, the islands in their pristine condition represent a wonderful amenity to local citizens, full of history, replete with scenery, rich with wildlife, and generous in ecological goods. A thriving fin and shell fishery supports an industry that dates back as far as human occupancy, as the prehistoric shell middens attest.

It was not feasible at the VCR simply to buy the rest of the land and add it to the reserve. We gradually realized that if the total ecosystem was to be maintained, the Conservancy would have to work with the rest of the community to develop and execute a common plan. The United Nations, in the early 1970s, had articulated a vision of large-scale conservation called "Man and the Biosphere". Borrowing from this concept, we began to think about practical applications. The Bioreserve idea was born.

Once we had agreed on the concept, four or five years ago, we began to undertake an orderly process to identify where the best and most promising areas were to be found. We also began thinking seriously about how to understand what large ecosystems require to maintain their integrity and how big, multifaceted reserve complexes could be managed. Finally, we began to consider how the Conservancy could equip itself as an organization to implement conservation successfully on this scale.

Selecting and Designing Bioreserves

Biodiversity scorecard process

The Nature Conservancy, in cooperation with State Natural Heritage Data Centers (see section on Managing Conservation Information), has developed what is probably the most systematic methodology in use today for the selection of candidate nature reserves for biodiversity conservation. This is referred to as the Biodiversity Scorecard Process (Chipley and Jenkins, 1987; Hoose, 1981; Morse, 1987). In this process an analysis is made of Elements of biodiversity by class of Element. The classes into which Elements are usually divided are natural communities, vertebrate animals, invertebrate animals, vascular plants, and nonvascular plants. For each of these classes, the Elements are arranged in descending order of endangerment (or conservation priority). Within this hierarchy the Element Occurrences (these are the examples of each Element at their geographic localities -- the area occupied by a population of a rare plant species, for instance) for each Element are arranged in descending order of overall quality. Then the best Occurrences of the most endangered Elements are combined into sites on the landscape where as many as possible of the highly ranked ones occur.

The Scorecard process is an iterative one in that priorities constantly change as conservation activities save a given site and the Element Occurrences it contains, or some destructive force eliminates the targeted Element Occurrences at another. Thus, a sort of conservation profit-and-loss statement is set up for the constant reassessment of conservation priorities. A number of conservation biologists doing statistical modeling analysis of simpler but more quantitative methods have recently concluded that such iterative approaches are the most efficient for conservation planning (Anselin et al., 1989; Kirkpatrick, 1983; Pressey and Nicholls, 1989).

Bioreserve selection

We began our Bioreserve selection process initially by asking the State Natural Heritage Programs and their Latin American counterparts (called Conservation Data Centers) to extend their thinking to very large sites of potential conservation interest. Partly they accomplished this by looking at all the clusters of high-priority smaller sites that, when looked at on small-scale maps, coalesce into reasonable complexes. They also used their broad knowledge of their regions to identify large areas that stood out in their own right because they contain relatively intact landscape mosaics. Finally, they looked at broad, ecoregional provinces within which there is little or no current land conservation to see whether they could identify feasible "gap-fillers." The Nature Conservancy's field offices joined in on these preliminary analyses, as did the various foreign institutions cooperating with our international program.

From this preliminary analysis we identified more than 400 Bioreserve candidate areas in North America and at least 200 more in Latin America, the Caribbean, and the Pacific (where we have a fledgling program). Subsequently, our field staff and cooperators, led by the scientific task forces in our regional offices, have been winnowing these lists to select the areas in which we will finally initiate Bioreserve

projects. In refining the lists, we have been considering such factors as representation of high-ranking Element Occurrences from the Scorecards, integrity of the existing ecosystem complex, the presence of Conservancy or other reserves that could form the nucleus for expanded activity, and any special factors of need or opportunity that could make a Bioreserve important and successful. Greater weight will be placed on larger community Occurrences and those in integrated landscape mosaics than on more pristine examples that may be smaller or exist as isolated fragments. As this refinement process continues, we will be cooperating closely with other conservation agencies, especially the U.S. Fish and Wildlife Service through its "gap analysis" program. This program employs computer mapping (using GIS, or Geographic Information Systems) of coarsely defined biological communities and the ranges of vertebrate species to identify major ecosystems, regional landscape types, and areas of special species richness that are underrepresented in existing reserves (Scott et al., 1988). Such gap analyses are being undertaken in a number of western states and are spreading to the eastern ones as well. All of them cooperate closely with the State Natural Heritage Programs and exchange information with them freely.

Another way in which the list of areas is being refined is through thematic conservation analyses carried out on a continental scale. For example, an analysis of prairie conservation in North America is being conducted by the Conservancy's Midwestern Regional Office, which is taking the lead for the whole country because its region covers the epicenter of historical prairie distribution. A number of Conservancy offices and Heritage programs will be cooperating on an analysis of endangered aquatic organisms and ecosystems. Our Eastern Regional Office will play a key role in this analysis because many of the endangered aquatic species are animals, and our Eastern Region manages our central animal databases. Other thematic analyses are being undertaken on migratory neotropical land birds and shorebirds to identify critical migratory stopover points and areas of important concentrations. A number of other agencies and institutions are concerned about migratory birds, and we will be cooperating with them wherever we can. Other thematic analyses will be started as additional themes emerge.

Bioreserve design

The process of Bioreserve selection is intimately related to the design of the landscape unit to be conserved, in terms of the size and shape of the area within the proposed project boundaries. As we focus more on the individual areas, we will be doing intensive inventories of the biota and ecosystems found on them and in the vicinity, using satellite imagery, aerial reconnaissance methods, and ground surveys. Boundaries can be extended to include important Element Occurrences not found within the initial target area. In many cases, a core area, often already protected, will be identified, along with a neighboring buffer zone in which activities designed to protect the core can be carried out.

As the process of selecting and designing Bioreserves continues, we will extend our analysis, depending especially on Heritage data, to identify important community and species Elements that are not represented on

any of the Bioreserve sites. These will become even higher priorities for conservation on smaller ancillary sites than they would have been in the usual Scorecard process. As much as possible, however, we will be concentrating on incorporating everything we can into a collection of large and more viable sites.

Managing Bioreserves

Bioreserve management

Bioreserve management can be divided into two parts: managing the strict nature preserves (what the Man and the Biosphere Program refers to as the "core" areas) and managing the buffer and multiple use lands. For a Bioreserve to be successful in the way we intend, management of both parts must be based on a solid understanding of the ecosystems, what they are like under "natural" conditions, and how they are likely to respond to our actions. To succeed we will have to study such systems in a more profound way than we ever have in the past.

Ecosystem management

Ecosystems and biotic communities are the sum total of numerous inputs; they are alive, and changeable. They react dynamically to whatever forces are exerted upon them -- a cold winter, a summer drought, a lightning fire, a strong wind, or a bulldozer. All the organisms in them are constantly striving against their physical environment and against each other. Almost any force will favor some more than others. Typically a strong enough force operating for a long enough time, or recurrently, will kill some outright. Usually others of a different species will replace it. If the original force ceases to operate, eventually the first species may reassert itself. An unusually strong force may effect such pronounced changes in the physical environment (such as total loss of topsoil or a drop in the water table) that the original species will be permanently excluded. If we aspire to be "ecosystem managers," we must look very closely at the ecosystems under our care to see if we can determine their most significant driving forces. Beyond this, we must decide what kinds of interventions we are capable of making and what sort of character we want these ecosystems to assume. It is clear that we cannot merely "let nature take its course" to produce a desirable result.

Ecological dynamism

That is how we used to think about nature. Our basic ecological paradigm was a steady state or equilibrium model where ecosystem characteristics were assumed to oscillate around a mean with a narrow range of variation over time and a "climax" condition toward which they were constantly tending. Not many ecologists think this way any more (Botkin, 1990). We have begun to focus much more on the long-term effects of climatic variations on regional ecosystems and on catastrophic site-specific events that profoundly affect ecosystems at the local scale. We have also come to realize that certain events that we once thought of as catastrophic are really recurrent in many systems, especially fires, and that the presence, absence, or frequency of such events can be as determinant of ecosystem character as climate. Moreover, we have come to recognize what a formidable geological force humans are and have been for a long time. We have a unique ability to start fires, divert water, and kill off keystone species. Finally, we cannot be completely confident

that our projects will achieve their aims, based on historic evidence, when humans themselves have ushered in an unprecedented collection of ambient insults including acid precipitation, ground-level ozone, intense ultraviolet radiation from the lack of high-altitude ozone, and greenhouse gas concentrations that will probably cause global climatic change at unique rates of speed.

Management prescription

After a Bioreserve site has been selected, the iterative process moves into its next phase of ecosystem analysis, modeling, and management prescription. In the long run, the real challenge in biological land conservation at any scale is not the legal or administrative protection of the real estate, which is only the beginning, but the proper management of ecosystems and species populations. It is a sufficiently complex matter just to recognize endangered communities and species and to identify the land areas most important to them. Understanding their individual relationship to the landscape, disturbance regimes, successional ecology, and susceptibility to cost-effective management interventions is far harder. It will be crucial that we develop the ability to determine the driving forces in a given Bioreserve or its component ecosystems and the threats to system integrity. In most cases, our management objectives will be keyed to the status of selected indicator species, physicochemical processes, or critical ecosystems.

Sustainable Uses of Buffer Lands

In addition to managing the core reserves in which the status of the biota is to be optimized on Bioreserves, we must cooperate with our fellow property owners to assist them in making use of the natural resources on their lands in ways that are minimally harmful to the biota. The very words "nature preserve" imply that humans have traditionally been regarded as an intolerable ingredient in the natural scheme of things. Conservationists have thought, not without reason, of humanity as being such a destructive force that natural elements we wish to preserve must be completely separated from human society, with a strong fence in between.

Humans in nature

In the 20th century, human society has become such a pervasive force that it is not practicable to insulate nature from it. Indeed, the human-occupied landscape has not been a total loss to the rest of the biota, many of which find niches to their liking there. Some, like starlings and house mice and the score or so of pervasive garden weeds, have prospered so well that they share our own explosive ecological success and have spread abundantly to nearly every landmass on Earth. Many more species hang on in the remnant seminatural habitats like hedgerows and drainage ditches. Under modified forms of management, even more species could survive in the human-dominated landscape. If seminatural meadows are not treated with pesticides, for example, they may make fine habitat for butterflies at the same time that they can be mowed for hay.

Balancing uses

As an example of the complexity of balancing the management of core reserves with multiple-use buffer lands, Janzen (1983) has concluded that if the object of a preserve is to maintain pristine community remnants, it may be more desirable for surrounding lands to be put into croplands or closely grazed pasture than in unmanaged successional ecosystems. This is counterintuitive to most of us, but Janzen maintains that the former contain fewer aggressive weedy species capable of invading the natural communities. Such invading exotic or early successional species could modify the species composition to the point that the biological interactions and even the physical ecology could be entirely changed, resulting in quite different conditions and associations than those we intended to preserve. This shows what biological conservationists face just to decide what constitutes "compatible land use" on the multiple-use matrix of a Bioreserve. It will be even more challenging to maintain the desired balance of uses over the long term.

Sustainability

A key idea in managing the multiuse landscape is "sustainability." Salwasser (1990a) reports that sustainable use/yield first emerged as a doctrine for managing single resources. It was applied to soils, timber, fisheries, game populations, agricultural crops, and even recreation. This worked well while there were available resources to enable single-use management to continue. As the demand for different resources began to compete for a given piece of land, the notion of multiple use developed. This was another good idea, that a variety of uses and benefits could be derived from the same forest or rangeland. Increasing demands have continued to place pressures on these resources to the point where sustainability for all or some of these uses becomes impossible.

People are now aware of the importance of ecosystem stability and the conservation of biological diversity, and it is time to bring some reality to what this means on the actual ground (or water). On the Bioreserves, core conservation areas will make up a key part of the landscape complex. Prudent conservation strategies will need to rely on the integration of many sustainable forms of land uses and resource management, including protection and production, restoration and enhancement, education and recycling.

Monitoring

Tracking effectiveness

Another important aspect of managing Bioreserves will be monitoring our effectiveness so that we can detect our failings as early as possible and modify our practices accordingly. Fortunately, the Conservancy has already developed considerable experience in this area from many ecological monitoring projects in existing reserves. Most of these are of single species population trends or of biological community responses to such things as prescribed burns. Such monitoring projects will be applicable to Bioreserves as well, where our management is likely to be set by the condition of indicator or keystone species or community types. We will also have to develop and apply additional methods, especially the use of remote sensing data. Periodic processing of satellite

imagery to detect changes in land use is one example. Aerial reconnaissance methodology, possibly employing videography as a cost-effective recording device, is another technology that we plan to explore.

Managing Conservation Information

Information management

Conservation information management cannot be discussed here in detail, but it is of such fundamental importance and the Conservancy has played such an important role in this area that some note needs to be taken of it (see Anonymous, 1991; Jenkins, 1985, 1986). Successful conservation in a complex world must become increasingly systematic and sophisticated, and achieving this goal requires the mastery of an extensive knowledge base. If we are to do what is needed and avoid wasting scarce resources on unnecessary or undesirable enterprises, we must achieve a much greater mastery than we currently have of the fields of knowledge relevant to biodiversity conservation. This includes knowledge of biota and ecosystems, of critical geographic relationships, of threats to biodiversity, of efficacious conservation techniques, of important actors and agencies in the conservation field, and of events that affect biodiversity both positively and negatively.

Over the past 20 years, The Nature Conservancy has done a great deal, in cooperation with various other institutions, in biodiversity and conservation data management (see Anonymous, 1991). The role of State governments especially deserves to be highlighted. Seventeen years ago the first State Natural Heritage Data Center was established as a cooperative effort between the South Carolina Department of Wildlife and Marine Fisheries and The Nature Conservancy as a permanent and dynamic program to master the information required for systematic biodiversity conservation in that state. This effort has now grown to include similar data centers in every one of the 50 states and most of the other countries in the western hemisphere. This data network is augmented by massive central databases maintained by the Conservancy itself. An increasing number of Federal agencies are arranging to connect to this system, often by installing counterpart data centers on their own land management units. They have also produced considerable quantities of the data now incorporated into the Heritage databases and are finding it more efficient to cooperate with a multi-institutional network to manage it. The similarities between managing large Federal areas for multiple uses and cooperatively managing multiownership Bioreserve complexes are producing useful convergences and efficiencies in the development of information system enhancements.

Information management, continued

In the iterative process of Bioreserve selection and design, the tremendous amount of biodiversity and conservation-related data amassed by the State and Latin American Natural Heritage Data Centers will be of incalculable importance. These data will permit Bioreserve selection and design to be carried out in a comprehensive biodiversity-conservation context in which the Heritage programs are the acknowledged leaders. Heritage information on individual species and community types will be

invaluable in choosing effective indicators, understanding threats to ecosystem function, developing models for integrated management, and designing and monitoring programs to measure degrees of success.

Expanding our information management scope to encompass Bioreserves entails many new challenges. Among the areas of special emphasis are computerized mapping and spatial information management, a field in which some of our Federal cooperators have made major advances. Another important area for system expansion involves the need to incorporate information about applied conservation technology into our networked databases. We are also making special efforts to interact more effectively with academic and agency research scientists, especially systematic biologists, and modification of our data systems to accommodate such interactions are under way.

Managing Project Activities

The Conservancy has been known widely as "the most business-like conservation organization" for many years. The size and complexity of this Bioreserve initiative will test us in this respect.

Institutional management

As an example of business-like practices, the Conservancy has always put stock in planning, performance evaluation, and accountability. Every unit of the Conservancy has worked under an annual plan for many years. We wrote the first long-range plan for the organization in 1971 and have written a new one every two or three years since. The process has also been decentralized outward to the Conservancy's individual state field offices, most of which have now been through a strategic planning process of their own.

When the Conservancy was undertaking mostly hundred-acre projects, they could often be conceived, launched, and completed quickly with the next one following immediately afterward. Bioreserves are clearly a different proposition, and we decided at the outset that they should be considered lifetime endeavors. Managerially, this approach is probably more good than bad, because nothing is more important than continuity of purpose. Nevertheless, operating on such a geographic and temporal scale will demand that we improve our planning process. Accordingly, an individual strategic plan will be developed for each approved Bioreserve with the same care that we put into our state and overall corporate plans.

Partnerships

Partnerships

No conservation organization is an island. Conservation carried out on any worthwhile scale has become too complicated for any group to attempt alone.

One of The Nature Conservancy's mottoes has always been, "We can work with you," and no one has exhibited a wider array of cooperative relationships. Our work with government agencies on cooperative land

acquisition projects dates back to the early 1960s, our corporate associates program to the 1970s. Through the State Natural Heritage Programs, we have established the closest working relationships with State governments (all of them) of any organization in the non-profit field. In Latin America, we work closely with cooperating non-governmental partners, endeavoring in all ways to help them become strong and effective organizations.

Almost all of the Conservancy's cooperative relationships are working partnerships developed with other institutions that want to accomplish specific tasks. The Bioreserves will necessitate a tremendous expansion and decentralization of partnerships to the level of county governments, county extension agents, local schools and colleges, municipalities, and perhaps most important of all, individual private landowners banded together to do something important locally.

Parks in Peril

The Bioreserve concept to be applied by our Latin American and Pacific programs is essentially the same as the one we will be following in the United States, but with several differences worth noting.

Non-U S Bioreserves

In many parts of the developing world, large parks and reserves have been established, usually by government decree. Many of these are in remote areas and in pristine condition. They include a number of internationally designated Biosphere Reserves, established with the multizone land complex in mind, often carefully conceived and designed. Unfortunately, they are also often entirely lacking in direct physical protection and management, constituting the "paper parks" mentioned frequently these days. These reserves often differ from those in the United States and other developed countries in that they contain people -- indigenous people and cultures as much endangered by the pace of change as any non-human inhabitants of these areas.

The most pressing need usually is for direct external assistance to mount a credible protection and management effort for these areas. Sometimes the financial assistance required is modest -- training, infrastructure support, and land tenure. It does not seem sensible to pass over these nascent protected areas while seeking to establish new ones. Therefore, much of the Bioreserve effort in Latin America, and probably in our new Pacific region, will be devoted to these "Parks in Peril."

Another major consideration in the Latin American region is that the tropical countries have the highest biodiversity in the world. The sheer number of species and the complexity of the ecosystems necessitate some differences in the way we conduct our inventory, data collection, data management, and iterative conservation planning. Because of the high biodiversity, "coarse filter" methods are particularly applicable; therefore, some of the remote sensing and aerial reconnaissance technologies mentioned in the section on monitoring will have much

wider use in the tropics. They will be used for rapid ecological assessment in selecting, designing, and data gathering on Bioreserves, as well as in long-term monitoring.

CONCLUSIONS

The Nature Conservancy believes that landscape-scale Bioreserves have a crucial contribution to make in maintaining our world's biological and ecological diversity. We believe that such Bioreserves will become increasingly important with time. Our efforts to date in selecting, establishing, and managing Bioreserves are merely the beginning of an immensely complex field of endeavor. In cooperation with other agencies and institutions, this effort will be a growing part of the Conservancy's activity throughout the 1990s.

The goal of our Bioreserve program is to make the landscape more livable for people as well as for other organisms. This is the essence of the Bioreserve idea. It is not a trivial experiment, for if we can develop our scientific management capacity to a sufficient level of competence, we can provide examples of human interaction with the environment that can serve as models for the world.

ACKNOWLEDGMENTS

I wish to thank Dennis Grossman, Larry Morse, and Carolyn Thurman for helping to prepare sections of this paper and Robert Chipley, Michael Coda, Gregory Low, Bruce Stein, and William Weeks for reading and criticizing it.

REFERENCES

Anonymous. 1969. Diversity and Stability in Ecological Systems. Brookhaven Symposiums in Biology #22. Brookhaven, New York: Brookhaven National Laboratory.

Anonymous. 1991 (continually revised). Natural Heritage Program Operations Manual. Arlington, Virginia: The Nature Conservancy.

Anselin, A., P.M. Meire, and L. Anselin. 1989. Multicriteria techniques in ecological evaluation: An example using the analytical hierarchy process. Biological Conservation 49:215-229.

Benke, A.C. 1990. A perspective on America's vanishing streams. Journal of the North American Benthological Society 9(1):77-88.

Borman, F.J., and G.E. Likens. 1979. Pattern and Process in a Forested Ecosystem. New York: Springer-Verlag.

Botkin, D.B. 1990. Discordant Harmonies: A New Ecology for the 21st Century. New York: Oxford University Press.

Brown, J.H., and A.C. Gibson. 1983. Biogeography. St. Louis, Missouri: C.V. Mosby.

Burgess, R.C., and D.M. Sharpe, eds. 1981. Forest Island Dynamics in Man-dominated Landscapes. New York: Springer-Verlag.

Chipley, R., and R.E. Jenkins. 1987. Preserve Selection and Design Manual. Arlington, Virginia: The Nature Conservancy.

Desert Fishes Council Endangered Species Committee. 1985. Endangered aquatic ecosystems in North American deserts with a list of vanishing fishes of the region. Journal of Arizona-Nevada Academy of Science 20(1):1-61.

Diamond, J.M. 1975. The island dilemma: Lessons of modern biogeographic studies for the design of natural preserves. Biological Conservation 7:129-146.

Diamond, J.M., and R.M. May. 1976. Island biogeography and the design of nature reserves. In Theoretical Ecology: Principles and Applications (R.M. May, ed.). Philadelphia, Pennsylvania: Saunders.

Ecological Society of America. 1921. Preservation of natural conditions. Springfield, Illinois: Ecological Society of America.

Ecological Society of America. 1926. Naturalist's Guide to the Americas. Baltimore, Maryland: Williams and Wilkins Company.

Ehrlich, P.R., and A.H. Ehrlich. 1981. Extinction: The Causes and Consequences of the Disappearance of Species. New York: Random House.

Emmanuel, W.R., H.H. Shugart, and M.P. Stevenson. 1985. Climatic change and the broad-scale distribution of terrestrial ecosystem complexes. Climatic Change 7:29-43.

Forman, R.T.T., and M. Godron. 1986. Landscape Ecology. New York: Wiley and Sons.

Franklin, I.R. 1980. Evolutionary change in small populations. In Conservation Biology: An Evolutionary-Ecological Perspective (M.E. Soule and B.A. Wilcox, eds.). Sunderland, Massachussetts: Sinauer Associates.

Franklin, J.F., D.A. Perry, T.D. Schowalter, M.E. Harmon, A. McKee, and T.A. Spies. 1989. Importance of ecological diversity in maintaining long-term site productivity. In Maintaining the Long-term Productivity of Pacific Northwest Forest Ecosystems (D.A. Perry et al., eds.).

Gilpin, M.E., and M.E. Soule. 1986. Minimum viable populations: Processes of species extinction. In Conservation Biology: The Science of Scarcity and Diversity (M.E. Soule, ed.). Sunderland, Massachusetts: Sinauer Associates.

Goodman, D. 1975. The theory of diversity-stability relationships in ecology. Quarterly Review of Biology 50:237-266.

Grumbine, R.E. 1990. Viable populations, reserve size, and federal lands management: A critique. Conservation Biology 4(2):127-134.

Harris, L.D. 1984. The Fragmented Forest: Island Biogeographic Theory and the Preservation of Biotic Diversity. Chicago, Illinois: University of Chicago Press.

Higgs, A.J. 1981. Island biogeography and nature reserve design. Journal of Biogeography 8:117-124.

Hoose, P.M. 1981. Building an Ark: Tools for the Preservation of Natural Diversity Through Land Protection. Covelo, California: Island Press.

Hutchinson, G.E. 1959. Homage to Santa Rosalia, or why are there so many kinds of animals? American Naturalist 93:145-159.

Iltis, H.H., J.F. Doebley, R.M. Guzman, and B. Pazy. 1979. Zea diploperennis (Gramineae): A new teosinte from Mexico. Science 203:186-188.

Janzen, D.H. 1983. No park is an island: Increase in interference from outside as park size decreases. Oikos 41:402-410.

Jenkins, R.E. 1975. The preservation of natural diversity. In The preservation of Natural Diversity: A Survey and Recommendations (J. Humke et al., eds.). Washington, D.C.: U.S. Department of Interior Report.

Jenkins, R.E. 1979. Macro-reserves: The coarsest filter. Natural Heritage News II(2):5-6.

Jenkins, R.E. 1985. Information methods: Why the Heritage programs work. The Nature Conservancy News 35(6):21-23.

Jenkins, R.E. 1986. Applications and use of biological survey data. In Foundations for a National Biological Survey (Kim, K.C. and L. Knutson, eds.). Lawrence, Kansas: Association of Systematics Collections.

Jenkins, R.E. 1989. Long-term conservation and preserve complexes. The Nature Conservancy Magazine 39(1):5-7.

Karr, J.R. 1981. Assessment of biotic integrity using fish communities. Fisheries 6(6):21-27.

Kirkpatrick, J.B. 1983. An iterative method for establishing priorities for the selection of nature reserves. Biological Conservation 25:127-134.

Lord, J.M., and D.A. Norton. 1990. Scale and the spatial concept of fragmentation. Conservation Biology 4(2):197-202.

Lovelock, J.E. 1979. Gaia: A New Look at Life on Earth. Oxford: Oxford University Press.

Lovejoy, T.E., and D.C. Oren. 1981. The minimum critical size of ecosystems. In Forest Island Dynamics in Man-Dominated Landscapes (R.C. Burgess and D.M. Sharpe, eds.). New York: Springer-Verlag.

Lovejoy, T.E., R.O. Bierregaard, Jr., A.B. Rylands et al. 1986. Edge and other effects of isolation on Amazon forest fragments. In Conservation Biology: The Science of Scarcity and Diversity (M.E. Soule, ed.). Sunderland, Massachusetts: Sinauer Associates.

MacArthur, R.H., and E.O. Wilson. 1967. The Theory of Island Biogeography. Princeton, New Jersey: Princeton University Press.

MacClintock, L., R.F. Whitcomb, and B.L. Whitcomb. 1977. Island biogeography and the "habitat islands" of eastern forest. II. Evidence for the value of corridors and minimization of isolation in preservation of biotic diversity. American Birds 31:6-12.

Maddox, D., and L.E. Morse. 1990. Plant conservation and global climate change. The Nature Conservancy Magazine 40(4):24-25.

Margules, C., A.J. Higgs, and R.W. Rafe. 1982. Modern biogeographic theory: Are there any lessons for nature reserve design? Biological Conservation 24:115-128.

Martin, P.C., and R.G. Klein, eds. 1984. Quarternary Extinctions: A Prehistoric Revolution. Tucson, Arizona: University of Arizona Press.

Master, L. 1990. The imperiled status of North American aquatic animals. Biodiversity Network News 3(3):1-2,7-8.

Master, L. 1991. Aquatic animals: Endangerment alert. Nature Conservancy 41(2):26-27.

May, R.M. 1974. Stability and Complexity in Model Ecosystems. 2nd ed. Princeton, New Jersey: Princeton University Press.

McAllister, D.E. 1991. What is biodiversity? Unpublished paper prepared for Keystone Center for dialogue on biodiversity conservation (available from The Nature Conservancy).

McMahan, L.R. 1990. Propagation and reintroduction of imperiled plants, and the role of botanical gardens and arboreta. Endangered Species Update 8(1):4-7.

McNeely, J.A., K.R. Miller, W.V. Reid, R.A. Mittermeier, and T.B. Werner. 1990. Conserving the World's Biological Diversity. Gland, Switzerland: International Union for Conservation of Nature and Natural Resources; Washington, D.C.: World Resources Institute, Conservation International, World Wildlife Fund - U.S., and the World Bank.

Menges, E.S. 1990. Population viability analysis for an endangered plant. Conservation Biology 4(1):52-62.

Miller, K.R. 1989. Global Strategy for Conserving Biodiversity. Washington, D.C.: World Resources Institute.

Morse, L.E. 1987. Rare plant protection, Conservancy style. The Nature Conservancy Magazine 37(5):10-15.

Murphy, D.D., K.E. Freas, and S.B. Weiss. 1990. An environment-metapopulation approach to population viability analysis for a threatened invertebrate. Conservation Biology 4(2):41-51.

Myers, N. 1983. A Wealth of Wild Species: Storehouse for Human Welfare. Boulder, Colorado: Westview Press.

Newmark, W.D. 1987. A land-bridge island perspective on mammalian extinctions in western North American parks. Nature 325:430-432.

Norton, B.G., ed. 1986. The Preservation of Species: The Value of Biological Diversity. Princeton, New Jersey: Princeton University Press.

Norton, B.G. 1987. Why Preserve Natural Variety? Studies in Moral, Political, and Legal Philosophy. Princeton, New Jersey: Princeton University Press.

Noss, R.F. 1986. From plant communitites to landscapes in conservation inventories: A look at The Nature Conservancy (USA). Biological Conservation 41:11-37.

Noss, R.F., and L.D. Harris. 1986. Nodes, networks, and MUMs: Preserving diversity at all scales. Environmental Management 10:299-309.

Office of Technology Assessment. 1987. Technologies to maintain biological diversity. OTA-F-330. Washington, D.C.: Congress of the United States.

Oldfield, M. 1984. The Value of Conserving Genetic Resources. Washington, D.C.: U. S. National Park Service.

Peters, R.L., and J.D.S. Darling. 1984. The greenhouse effect and nature reserves. BioScience 35:707-717.

Pickett, S.T.A., and J.N. Thompson. 1978. Patch dynamics and the size of nature reserves. Biological Conservation 13:27-37.

Pimm, S.L. 1984. The complexity and stability of ecosystems. Nature 307:321-326.

Pressey, R.L., and A.O. Nicholls. 1989. Efficiency in conservation evaluation: Scoring versus iterative approaches. Biological Conservation 50:199-218.

Ranney, J.W., M.C. Bruner, and J.B. Levenson. 1981. The importance of edge in the structure and dynamics of forest islands. In Forest Island Dynamics in Man-Dominated Landscapes (R.L. Burgess and D.M. Sharpe, eds.). New York: Springer-Verlag.

Reid, W. V., and K. R. Miller. 1989. Keeping Options Alive: The Scientific Basis for Conserving Biodiversity. Washington, D.C.: World Resources Institute.

Salwasser, H. 1990. Conserving biological diversity: A perspective on scope and approaches. Forest Ecology and Management 35:79-90.

Salwasser, H. 1990a. Sustainability as a conservation paradigm. Conservation Biology 4(3):213-216.

Saunders, D.A., G.W. Arnold, A.A. Burbridge, and A.J.M. Hopkins. 1987. Nature Conservation: The Role of Remnants of Native Vegetation. Chipping Norton, N.S.W., Australia: Surrey Beatty and Son.

Saunders, D.A., R.J. Hobbs, and C.R. Margules. 1991. Biological consequences of ecosystem fragmentation: A review. Conservation Biology 5(1):18-32.

Scott, J.M., B. Csuti, K. Smith, J.E. Estes, and S. Caicco. 1988. Beyond endangered species: An integrated strategy for the preservation of biological diversity. Endangered Species Update 5:43-48.

Segman, R. 1959. Wanted: Poisonous fish. Science News Letter, June 27, 407 and 410.

Shafer, C.L. 1990. Nature Reserves: Island Theory and Conservation Practice. Washington, D.C.: Smithsonian Institution Press.

Shaffer, M.L. 1981. Minimum population sizes for species conservation. BioScience 31:131-134.

Shaffer, M.L. 1990. Population viability analysis. Conservation Biology 4(1):35-40.

Simberloff, D., and L.G. Abele. 1982. Refuge design and island biogeographic theory: Effects of fragmentation. American Naturalist 120:41-50.

Simberloff, D., and J. Cox. 1987. Consequences and costs of conservation corridors. Conservation Biology 1(1):63-71.

Simpson, B.B., and M. Connor-Ogorzaly. 1986. Economic Botany: Plants in Our World. New York: McGraw-Hill.

Soule, M.E., ed. 1987. Viable Populations for Conservation. New York: Cambridge University Press.

Stone, C.D. 1988. Should Trees Have Standing? Portola Valley, California: Tioga Publishing Company.

Terborgh, J. 1989. Where Have All the Birds Gone? Princeton, New Jersey: Princeton University Press.

Thompson, R.S. 1988. Vegetation dynamics in western United States: Modes of response to climate fluctuations. In Vegetation History (B. Huntley and T. Webb III, eds.). Volume VII in Handbook of Vegetation Science (H. Leith, ed.). Dordrecht, The Netherlands: Kluwer Publishers.

The Nature Conservancy. 1981. 30th Anniversary Issue: A History. The Nature Conservancy News. 31(4):1-30.

UNESCO. 1974. Report of the Task Force on Criteria and Guidelines for the Choice and Establishment of Biosphere Reserves. MAB Report Series 22. Paris: UNESCO.

UNESCO. 1984. Action plan for Biosphere Reserves. Nature and Resources 20(4):1-12.

Webb, T., III. 1987. The appearance and disappearance of major vegetational assemblages: Long-term vegetational dynamics in eastern North America. Vegetatio 69:177-187.

Wegner, J.F., and G. Merriam. 1979. Movements by birds and small mammals between a wood and adjoining farmland habitats. Journal of Applied Ecology 16:349-357.

Whitney, G.G., and J.R. Runkle. 1981. Edge versus effects in the development of a beech maple forest. Oikos 37:377-381.

Whittaker, R.H. 1975. Communities and Ecosystems. 2nd ed. New York: Macmillan.

Wilcove, D.S., C.H. McLellan, and A.P. Dobson. 1986. Habitat fragmentation in the temperate zone. In Conservation Biology: The Science of Scarcity and Diversity (M.E. Soule, ed.). Sunderland, Massachusetts: Sinauer Associates.

Willis, E.O. 1974. Populations and local extinctions of birds on Barro Colorado Island, Panama. Ecological Monographs 44:153-169.

Wilson, E.O. 1980. Resolutions for the 80's. Harvard Magazine, January-February.

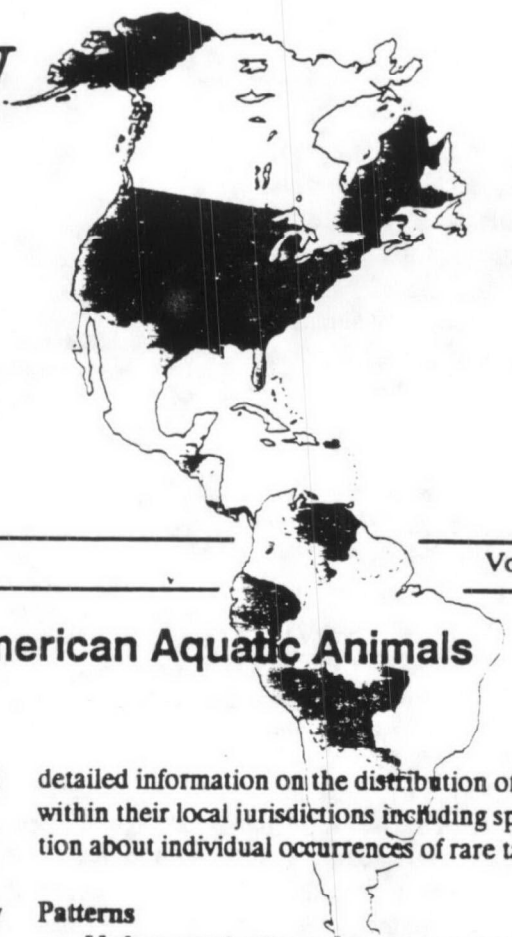
Wilson, E.O. 1984. Biophilia. Cambridge, Massachusetts: Harvard University Press.

Yahner, R.H. 1988. Changes in wildlife communities near edges. Conservation Biology 2:333-339.

Biodiversity Network News

Biological and Conservation Data and Applications

Vol. 3, No. 3, 1990



The Imperiled Status of North American Aquatic Animals

Larry Master, Chief Zoologist

A remarkably diverse assemblage of freshwater fishes and invertebrates live in North America's rivers and lakes. For example, more than 700 native species of freshwater fishes, 300 species of freshwater (unionid) mussels, and 300 species of crayfishes occur north of Mexico. Diversity in these and other aquatic groups is particularly high in the southeastern United States, perhaps due to the topographic diversity and relative climatic stability. No other areas in the world have as many endemic aquatic gastropods (snails) as the Coosa River drainage in Alabama or as many endemic freshwater mussels as the Tennessee River system (Palmer 1985). The Tennessee River system also boasts 52 darter species, almost one-third of the family Percidae, a worldwide group of fishes (Page 1983). Although the North American diversity of fishes and aquatic invertebrates does not approach that of tropical rivers in South America, Africa, and Asia, it far exceeds that of European fresh waters (Sheldon 1988).

All North American fishes, mollusks, crayfishes, dragonflies, damselflies, and other selected aquatic invertebrates are tracked in the central zoological databases at The Nature Conservancy Headquarters. For each taxon (a species or subspecies), these central databases track the standard scientific and common names and synonyms; global, national, and state or provincial ranks and official statuses; distributions; habitats; ecology and other life history information; management information; and much more. This information is continuously augmented and updated through the collective efforts of the network of individual data centers working closely with the academic community, especially systematists and the museum community. Individual data centers, which routinely and regularly exchange information with the central databases and also access them directly, maintain considerably more detailed information on the distribution of these species within their local jurisdictions including specific information about individual occurrences of rare taxa.

Patterns

Unfortunately, there are many rare and imperiled aquatic taxa among the thousands of vertebrates and invertebrates tracked in these databases. A recent search of the Conservancy's central databases revealed the interesting data in *Figure 1* (Page 2). Note the relative rarity (percent of species ranked GX-G3) of species in aquatic groups. In comparison, the terrestrial fauna of North America is relatively intact.

Several recent papers review the disquieting status of North America's aquatic fauna. A recent paper by Williams *et al.* (1989) reviews the status of fishes in North America including Mexico. The authors list as endangered, threatened, or special concern 364 species or subspecies, including approximately 30% of the native freshwater fish species found in North America north of Mexico. Since the previous version of this list (Deacon *et al.* 1979), 139 taxa have been added and 26 taxa have been deleted. The 26 deleted taxa include 16 taxa removed because of better information on their taxonomy or status and ten taxa now thought to be extinct. Although no taxa were removed from the list due to successful recovery efforts, the authors suggest that their list would have been much longer "without the strong effort of federal, state, and private organizations" to protect aquatic habitats.

Similar patterns of endangerment can be seen in other groups of aquatic organisms. Freshwater mollusks

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have been particularly impacted. One in every ten North American freshwater mussel species has become extinct in this century, and a majority of the remainder are imperiled. 62 species of aquatic snails endemic to Alabama's Coosa River are thought to be extinct (Palmer 1985).

Causes of Imperilment

Miller *et al.* (1989) review the causes of the extinctions of 27 species and 13 subspecies of North American (including Mexican) fishes during the past century. They conclude that the most important cause of the decline and subsequent extinction of these fishes was "habitat loss," a contributing factor for at least 73% of the 40 taxa. The second most common factor was the competitive and predatory effects of introduced species (cited for 68% of the 40 taxa). These factors are followed by chemical alteration or pollution (38%), hybridization (38%), and overharvesting (15%).

Similarly, Williams *et al.* (1989) list five types of threats, either singly or in combination, for each of the 364 imperiled freshwater fish taxa discussed in their report. Habitat loss, involved in 93% of the listings, figured even more prominently in their study. The biological effects of introduced species, including hybridization, and restricted range were the other major factors contributing to a species listing (Hartel 1990). Based on trends since a similar study was published ten years earlier, Williams *et al.* inescapably conclude: "The health of aquatic habitats in North America continues to decay."

Palmer (1985) and Stansbery (1970) indicate stream impoundment and pollution to be the most important factors leading to the imperiliment of freshwater mollusks. Stream impoundment, resulting in upstream flooding and siltation, causes lowered oxygen levels or the loss of well-oxygenated riffle habitat required by many species. In addition, fluctuations in daily discharges and cold-water (hypolimnetic) discharges are often factors downstream from dams.

Figure 1. Status of Selected Animal Groups of North America

No. of U.S. Species Ranked (not subspecies)	Mammals	Birds	Reptiles	Amphibians	Fishes	Cray-fishes	Unionid Mussels
GX (extinct)	1	20	0	3	18	1	12
GH (historical; possibly extinct)	0	2	0	1	1	2	17
G1 (critically imperiled)	8	25	6	23	78	62	88
G2 (imperiled)	23	9	10	17	72	49	49
G3 (rare, not imperiled)	19	23	25	28	110	84	35
G4-G5 (widespread & abundant)	330	628	251	153	549	106	73
G? (not yet ranked)	62	55	9	3	24	9	28
Total	443	762	301	228	852	313	300
% of Total = GX-G3	13	11	14	28	34	65	73
% of Total = E or T*	6	5	6	3	7	1	11

*The final line represents the percent of species listed by the U.S. Fish and Wildlife Service or National Marine Fisheries Service as Endangered or Threatened as of 4/15/90.

Other reasons for the demise of our freshwater fauna are less obvious. Part of the problem certainly relates to public relations. Aquatic species lack fur or feathers and exist in environments where few persons can see and appreciate them. It is much more difficult to muster public support for their conservation (Sheldon 1988). Most small nongame fishes, for example, are usually perceived as "minnows" whose primary value lies in their use as bait or food for larger species. Moreover, fishes have been somewhat ignored by conservation biologists. (For an interesting viewpoint on this topic, see McClanahan 1990.) Although at least 56% of native freshwater fishes in the U.S. and Canada receive some legal protection in at least part of their range (Johnson 1987), far fewer, especially in proportion to birds and mammals, are listed by the U.S. Fish & Wildlife Service and National Marine Fisheries Service as endangered or threatened (Allendorf 1988; Sheldon 1988; and compare the last two lines in the table derived from TNC's central databases).

All species have a right to live. From a practical point of view, these species are of immense value to us; fish are a major source of food worldwide. As the oldest, largest, and most diverse group of vertebrates, fish are valued by scientists as "experimental models for studies in embryology, neurobiology, endocrinology, environmental biology, and other areas" (Powers 1989). For example, the gila topminnow (*Poeciliopsis occidentalis*), federally listed as endangered, is being used for cancer research in Germany. Many of these species are obvious indicators of water quality. As Sheldon (1988) asserts: "The conservation of fishes is also compatible with the protection of other organisms, such as mollusks and crayfishes, and of riparian vegetation, water quality, amenity, and the entire spectrum of values of running-water ecosystems."

Solutions

Conservationists should give increased attention to rare aquatic taxa because their numbers are disproportionately imperiled when compared to terrestrial fauna. Heritage program biologists are already doing this in a number of

"Aquatic Animals" continued page 7

Field Notes

Louisiana

As a result of recommendations made by Louisiana Heritage Program and others, hundreds of thousands of waterbirds within the Chandeleur chain of islands are now federally protected and managed. Under the Louisiana Barrier Islands Management Agreement, the Louisiana Department of Wildlife and Fisheries transferred management of several small islands in the Chandeleur and Breton Sounds to the U.S. Fish and Wildlife Service as part of the Breton National Wildlife Refuge, the second oldest refuge in the country.

Nesting tern colony. Photo: U.S. Fish & Wildlife Service

The transferred islands include Curlew, North, New Harbor, Free Mason, Old Harbor Island Shoal, North and South Grand Gosier, and "any unnamed or new islands that may develop active waterbird nesting colonies." The largest tern nesting colony in the United States (approximately 60,000 nests) can be found on these islands, as well as 1,900 brown pelican nests, tens of thousands laughing gull nests, numerous wading bird rookeries, and nesting beaches for threatened marine sea turtles.

Gary Lester states that the agreement, which runs through April 30, 2015, helps to guarantee the islands and surrounding waters will remain one of the most fertile wildlife and fisheries habitats in the country.

"Aquatic Animals" from page 2

states. In Montana, Natural Heritage Program Coordinator/Zoologist David Genter is working with the University of Montana and the American Fisheries Society to develop a gene-strain registry for monitoring the genetic purity of cutthroat trout (see *BNN 2:1*). Nevada Heritage Program Coordinator/Zoologist Glenn Clemmer is working with the U.S. Fish and Wildlife Service and the Nevada Department of Fish and Wildlife on a recovery plan for the Big Spring Spinedace (*Lepidomeda mollispinis pratensis*). Ron Cicerello, Kentucky Nature Preserves Commission Zoologist, will be leading a workshop on aquatic species identification, protection, monitoring, and management at this fall's Eastern North American Heritage Conference. Heritage Zoologists in most eastern states spend a significant proportion if not a majority of their field time surveying and accumulating information on rare aquatic species in their states.

Inventory efforts and current information on the whereabouts and status of rare aquatic species are only the beginning of the solution. To protect aquatic systems conservation workers must assess not only impacts in the immediate vicinity of the element occurrence, but also potential impacts far removed (e.g., upstream). As Sheldon (1988) and Williams et al. (1989) point out, conservationists should consider the protection of entire watersheds and ecosystems.

The Nature Conservancy and other organizations, using data compiled by Heritage Programs in the U.S. and Conservation Data Centers in Canada and Latin America, are beginning to tackle the conservation of aquatic systems in earnest. Past Conservancy initiatives include a campaign to protect selected rivers in the South, funded in large part by the R.K. Mellon Foundation, and a "streams of life" campaign by the Conservancy's Arizona Field Office. New initiatives include multi-institutional efforts to protect Big Darby Creek in Ohio, French Creek in Pennsylvania and New York, and selected Upper Tennessee and Cumberland river drainages in Virginia, Kentucky and Tennessee--the most diverse riverine systems in each state. We can only hope that these and other efforts are not too little, too late for the remaining extant but imperiled taxa inhabiting North America's freshwater ecosystems.

Literature Cited

Allendorf, F. W. 1988. Conservation biology of fishes. *Conservation Biology* 2:145-148.

Deacon, J. E., G. Kobetich, J. D. Williams, S. Contreras, and others. 1979. Fishes of North America endangered, threatened, or of special concern: 1979. *Fisheries* (Bethesda) 4:29-44.

Hartel, K. E. 1990. *Declining North American fishes*. Museum of Comparative Zoology, Harvard University, Cambridge. Unpubl. manuscript.

Johnson, J. E. 1987. *Protected fishes of the United States and Canada*. American Fisheries Society, Bethesda, MD. 42pp.

McClanahan, T. R. 1990. Viewpoint: Are conservationists fish bigots? *BioScience* 40:2.

Miller, R. R., J. D. Williams, and J. E. Williams.

"Aquatic Animals" cont'd page 8

"Aquatic Animals " from page 7

1989. Extinctions of North American fishes during the past century. *Fisheries* (Bethesda)14:22-38.

Page, L. M. 1983. *Handbook of darters*. Illinois Natural History Survey, Champaign. 271 pp.

Palmer, S. 1985. Some extinct mollusks of the U.S.A. *Ataia* 13:1-7.

Powers, D. A. 1989. Fish as model systems. *Science* 246:352-358.

Sheldon, A. L. 1988. Conservation of stream fishes: patterns of diversity, rarity, and risk. *Conservation Biology* 2:149-156.

Stansbery, D. H. 1970. Eastern freshwater mollusks: (1) The Mississippi and St. Lawrence River systems. *Malacologia* 10:19-21.

USDI (U.S. Department of the Interior). 1990. Endangered and threatened wildlife and plants. Title 50, Code of Federal Regulations 17.11 and 17.12, 15 April 1990. U.S. Fish and Wildlife Service, Washington, D.C. 36 pp.

Williams, J. E., J. E. Johnson, D. A. Hendrickson, S. Contreras-Balderas, J. D. Williams, M. Navarro-Mendoza, D. E. McAllister, and J. E. Deacon. 1989. *Fishes of North America endangered, threatened, or of special concern: 1989*. Fisheries (Bethesda) 14:2-20.

Biodiversity Network News, Vol. 3, No. 3, 1990. The Nature Conservancy, Science Division newsletter is published quarterly for Heritage, CDC and TNC staff, volunteers and cooperators.

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United States
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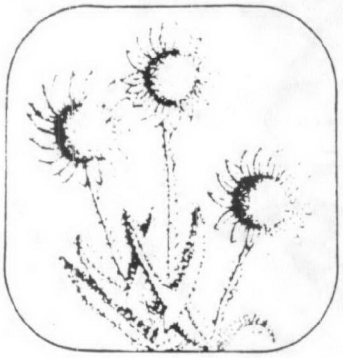
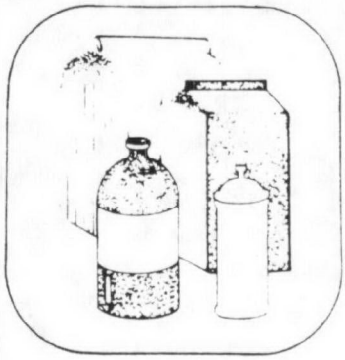
Pesticides And
Toxic Substances
(H7506C)

Summer 1990

EPA Endangered Species Update





Message . . .

From Susan Wayland
Deputy Director
Office of Pesticide Programs

Recently, I had the delightfully difficult job of helping to select a new endangered species design from among several hundred competing entries. We were impressed with the creativity of the designs submitted! Congratulations to Mr. Dale Herter whose winning entry (shown inside) expresses a complex theme in a simple and compelling vision.

During the remainder of 1990, EPA's Endangered Species Protection Program will concentrate on:

- implementing five state pilot programs (FL, NM, ND, SC, and CA);
- developing and distributing educational materials;
- reaching agreement with pesticide manufacturers, USDA, and the Cooperative Extension Service on bulletin distribution; and
- publishing the final Endangered Species Protection Program in the Federal Register.

As always, we are seeking practical solutions that preserve American agriculture while protecting endangered species. The subject of our lead article -- new and innovative state programs -- is an important step in finding that balance.

State-Initiated Endangered Species Protection Plans

A number of states have moved ahead in developing endangered species protection plans. They include California, Florida, Hawaii, Iowa, New Mexico, North Dakota, and South Carolina. EPA has encouraged states to initiate plans that tailor endangered species protection measures to the needs and circumstances of each state. State-initiated recommendations offering equal or greater protection will be accepted by EPA as the federal requirements within that state, when approved by the Fish and Wildlife Service. Most of the proposed state-initiated plans rely on the federal system of maps and bulletins, but they also make use of a variety of other techniques and approaches, some of them highlighted below.

Landowner Agreements in Iowa

For species with highly restricted ranges, landowner agreements are becoming an increasingly popular option. In Iowa, plans are being developed to solicit agreements with landowners to protect the prairie bush-clover from pesticide-related threats (see page 4 for a profile of this species). The agreements will represent formal written contracts between the landowner and the Iowa Department of Agriculture and Land Stewardship (IDALS). Where agreements cannot be negotiated, the affected areas will come under the EPA labeling bulletin approach as well as state pesticide regulations affecting endangered species.

The advantages of a landowner agreement include the opportunities for offering individualized education on pesticide management; defining contractual responsibility for the landowner to monitor an endangered species; and keeping the disclosure of endangered species sites to a minimum, thereby preventing potential vandalism and/or illegal collecting.

In Iowa, numerous agencies are involved. IDALS is the state lead agency on pesticide control regulations and is handling the negotiation and monitoring of landowner agreements. The Iowa Department of Natural Resources is assisting IDALS in identifying populations of prairie bush-clover by pinpointing habitat areas and developing management plans for protection of the species. Finally, the Iowa State University Extension Service is developing and distributing educational materials on the prairie bush-clover and pesticide practices.

Another individualized approach, short of landowner contracts, is being taken in New Mexico and North Dakota where state officials intend to meet with

Continued on page 3

Endangered Species Design Contest

In celebration of Earth Day 1990, EPA's Office of Pesticide Programs, in cooperation with the World Wildlife Fund, held a design contest for the Endangered Species Protection Program. Close to 200 entries were submitted, on the theme of "how all species and elements in the ecosystem interrelate."

The winning design is pictured here and was displayed at the Capitol Mall in Washington, D.C. during Earth Week. Our winner, Dale Herter of Seattle, Washington, is not a professional artist -- in fact, he had to make a special trip to an art supply store to purchase a compass in order to draw the design.

Mr. Herter is a professional biologist who works part-time for Alaska Biological Research, a private research company located in Fairbanks, investigating wildlife habitats in areas scheduled for oil exploration or development. Mr.

Dale Herter's winning entry

Herter also works as an independent consultant in the Seattle area. Most recently he has been conducting spotted owl surveys for the Seattle-based Plum Creek Timber Company.

As a hobby, Mr. Herter occasionally leads natural history tours in Alaska, where he lived for 10 years. We asked him how he came up with the idea for the design. He replied that when he saw the notice for the contest posted at the University of Washington, his reaction was, "wow, you're asking for the world!"

In Mr. Herter's design of the world, South America is represented by the Minnesota trout lily, North America by a bird, and "to show that the world is a pretty small place, I encased it in a drop of water."

Runners-up in the contest were Preston M. Williams of North Augusta, SC who is graduating this summer with a Bachelor's degree in graphic design and works as a manager in visual merchandising for several retail stores; Troy Chrisanthis of Columbia, SC, a student in graphic design at the University of South Carolina; Susan L. Weissman, a commercial graphics designer in McLean, VA who teaches illustration at Northern Virginia Community College; and Allen Demorest of San Pablo, CA, who works at EPA's Region 9 office.

Thanks to all of you who entered our contest, celebrating Earth Day along with the employees of EPA. Your hard work and creativity were an inspiration to everyone. We hope that you can continue to express your concerns for the environment through your artwork.

Update on Canada's Endangered Species Program

As of June 1989, 181 plant and animal species were included on Canada's endangered species list. Species are assigned to one of five categories: vulnerable, threatened, endangered, extirpated, or extinct. Since 1977 representatives of federal, provincial, and territorial governments and national conservation organizations have cooperated on listing endangered species, research, and information exchange through the Committee on the Status of Endangered Wildlife in Canada (COSEWIC).

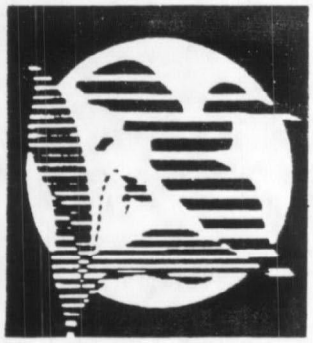
A separate initiative called the Renew Program has also begun recovery programs for endangered terrestrial vertebrates. Although there are currently no plans for federal endangered species legislation, endangered species initiatives may be included in the Canadian government's Environmental Agenda, expected out this Fall.

Pesticidal threats to endangered species are just beginning to receive attention in Canada. A joint government/private commission of the Pesticide Review Board was recently given a mandate to examine the pesticide registration process and recommend improvement. The commission's report is expected to be circulated for comment by this summer.

At the Canadian Wildlife Service, work is proceeding on incorporating endangered species data into a geographic information system, and on efforts to build endangered species considerations into the regular hazard assessments for pesticides. To date, this has been done only for carbofuran. Special reviews are also underway on some herbicides (atrazine and MCPA), which may include endangered species assessments. Evaluations of ecological hazard data are performed by three agencies of two federal departments (the Canadian Wildlife Service and the Commercial Chemicals Branch of Environment Canada, and the Department of Fisheries and Oceans) before being turned over to the Agriculture Department for a final decision on pesticide registration.

For further information on pesticide hazard assessment, contact Pierre Mineau at the Canadian Wildlife Service, (819) 997-3045. To receive the *Recovery* newsletter, contact the Editor, *Recovery* Newsletter, Canadian Wildlife Service, Environment Canada, Ottawa, Ontario K1A 0H3.

Design Contest Runners Up



Preston M. Williams

Troy Chrisanthis

Susan L. Weissman

Allen Demorest

State-Initiated Plans (continued)

individual growers who have fields inside the restricted map areas. Based on their cropping plans and pesticide use patterns, growers will be assisted in developing pest control plans using alternative pesticides or other management strategies for affected fields.

Ranking Species in Hawaii

Several states are ranking the listed species located within their borders in order to prioritize their efforts. In Hawaii, for example, a committee uses general knowledge of range, distribution, and habitat to rank each species on a scale of 0 to 5. A rank of 5 represents the highest potential for pesticides to affect a species. Out of 29 endangered and threatened animal species in Hawaii, 7 were given a rank of 4-5 (high risk); the remaining 22 received a rating of 0-1 (slight risk). Hawaii proposes to undertake protection efforts beginning with higher risk categories first.

Ranking Sites in North Dakota

North Dakota is also using a ranking system, in this case grouping sites rather than species. The state is concerned with three endangered species -- piping plovers, least terns, and bald eagles. Portions of 21 counties have been identified as "A" sites, meaning that one or more of the endangered species breeds at the site. "A" sites are to be surveyed every year; they include a half-mile buffer zone around the actual breeding location, and pesticide use limitations apply at these sites. "B" sites have suitable habitat, but the endangered birds have been known to breed in these locations only one year in the last six years. These areas are to be surveyed every year for the presence of the birds. Finally, "C" sites are historic breeding sites for the species with no activity in the past 10 years. The North Dakota plan includes provisions for updating these habitat categories and for including site designations in the map and bulletin system.

Species Plans in Florida

The State of Florida has developed prototype "species plans" to implement a tailored program for each species separately. In these plans, basic information about a species' biology is used to develop a specific program of education, monitoring, and pesticide use. The first prototype plan developed was for the everglade snail kite which migrates into agricultural areas during years of drought. By monitoring the water levels within the conservation areas where the bird normally nests, Florida officials hope to anticipate the snail kites' movements into drought areas. The plan's pesticide use program would go into effect in these areas only at such times.

Task Forces in Florida and New Mexico

Task forces have been established in several states to help develop and implement an endangered species/pesticide program and to reflect a wide range of concerns. In Florida, for example, the task force is comprised of 34 members, with representatives from federal, state, and local governments, agriculture, and environmental organizations.

Another model is the New Mexico Endangered Species Task Force, made up of federal and state officials from the New Mexico Departments of Agriculture; Energy, Minerals, and Natural Resources; Game and Fish; The State Land Office; Highway Department; and the New Mexico State University Cooperative Extension Service, as well as the U.S. Fish and Wildlife Service, Bureau of Land Management, and Forest Service.

In addition to providing general guidance in implementing the program, the New Mexico task force is expected to play a key role in evaluating applications for special use permits. Using specific maps which show the exact location of listed plant species, the task force can approve applications for special permits to use pesticides within the prescribed buffer zones, if they determine that such use will not adversely affect the listed species. □

Profile of a Threatened Species: Prairie Bush-Clover

With support from EPA, natural resource agencies in several states are negotiating agreements with landowners to protect the threatened prairie bush-clover (*Lespedeza leptostachya*) from pesticide exposure and other threats.

The delicate clover, a member of the pea family, has been federally listed since 1987. Prairie bush clover currently grows in only 37 sites, located in Iowa, northern Illinois, southern Wisconsin, and southern Minnesota. It is a herbaceous perennial, usually found on gentle, north-facing slopes of prairies. Stems can grow to one meter in height and flowers can be white or yellowish-white to light pink with a magenta mark.

Agricultural activity has greatly reduced the available habitat of prairie bush clover. Current threats include conversion of pasture to cropland, heavy grazing, herbicide application, and rural residential development.

Photo by Nancy Benish

Prairie bush clover is one of only two species providing native genetic stock for breeding of cold tolerant bush clovers suitable for the midwest.

Approximately 40 percent of known prairie bush clover sites are protected as dedicated state nature preserves, scientific and natural areas, and preserves managed by private conservation organizations such as The Nature Conservancy. A large number of prairie bush clover sites also occur on private lands where many owners have maintained the species through conservation-minded agricultural practices.

More information is contained in a brochure entitled *Prairie Bush Clover: A Threatened Midwestern Plant*, prepared by the Minnesota Natural Heritage Program of the Minnesota Department of Natural Resources in cooperation with the Office of Endangered Species of the U.S. Fish and Wildlife Service. Copies are available by calling (612) 296-3344.

Other state agencies responsible for protecting prairie bush-clover are the Illinois Natural Areas Inventory, Illinois Department of Conservation, (217) 785-8774; the Bureau of Preserves and Ecological Services, Iowa Department of Natural Resources, (515) 281-8524; and the Bureau of Endangered Resources, Wisconsin Department of Natural Resources, (608) 267-5037.

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Endangered Species Resources

Endangered species resources are available from EPA's Office of Pesticide Programs, Endangered Species Protection Program (H7506C), U.S. EPA, 401 M Street SW., Washington, DC 20460

Interim Pamphlets

EPA has developed interim pamphlets to help pesticide users avoid harming local threatened and endangered species. Interim pamphlets are available for the following counties:

Arizona

Cochise	Mohave
Coconino	Navajo
Gila	Pima
Graham	Pinal
Maricopa	Yavapai

Georgia

Baker	Maury
Burke	Rabun
Decatur	Stephens
Dooly	Sumter
Floyd	Towns
Gordon	Walker
Hambersham	Wheeler
Lee	Whitfield

Iowa

Clayton	Fayette
Dubuque	Jackson

Maryland

Harford

Michigan

Alcona	Montmorency
Clare	Ogemaw
Crawford	Oscoda
Iosco	Presque Isle
Kalkaska	Roscommon
Missauke	

Mississippi

Bolivar	Itawamba
Clairborne	Jackson
Copiah	Monroe
Hinds	Sunflower

New Mexico

Catron	Otero
Chaves	Rio Arriba
Dona Ana	San Juan
Eddy	Sierra
Lincoln	Socorro
McKinley	

North Carolina

Avery	Mitchell
Henderson	

North Dakota

Benson	McLean
Burke	Mercer
Burleigh	Morton
Divide	Mountrail
Dunn	Oliver
Eddy	Pierce
Emmons	Sheridan
Kidder	Sioux
Logan	Stutsman
McHenry	Ward
McIntosh	Williams
McKenzie	

Oklahoma

Le Flore, McCurtain, Pushmataha (tri-county)

Oregon

Harney	Wallowa

Tennessee

Anderson	Franklin
Bedford	Giles
Bradley	Moore
Campbell	Morgan
Carter	Polk
Cumberland	Putnam
Davidson	Rutherford
Fentress	Wilson

Texas

Aransas	Culberson
Austin	El Paso
Colorado	Hudspeth

Virginia

Pulaski

West Virginia

Monongalia

Fact Sheets

EPA is creating a series of fact sheets to inform the general public about endangered species. Fact sheets provide historical and scientific information, describe the threats to each species, and summarize the efforts being undertaken to protect them. Fact sheets are now available for the following endangered species:

- Arizona Cliffrose
- Attwater's Prairie Chicken
- Bald Eagle
- Brady Pincushion Cactus
- Chapman's Rhododendron
- Florida Torreya
- Fresno Kangaroo Rat
- Iowa Pleistocene Snail
- Minnesota Trout Lily
- Mississippi Sandhill Crane
- Navajo Sedge
- Okaloosa Darter
- Painted Snake Coiled Forest Snail
- Peebles Navajo Cactus
- Persistent Trillium
- Piping Plover
- Pondberry
- Prairie Bush-Clover
- Siler Pincushion Cactus
- Tennessee Purple Coneflower
- Wood Stork

EPA

Partners in Flight - Aves de las Americas

The Water Program Connection

One of today's most widely discussed conservation issues is the dramatic decline in the populations of neotropical migratory birds. In response to this concern, an innovative partnership of public and private organizations has been established under the auspices of the National Fish and Wildlife Foundation. This new effort, called *Partners in Flight - Aves de las Americas* and formally known as the Neotropical Migratory Bird Conservation Program, was launched in 1990, through the execution of memoranda of agreement among a number of key federal agencies and conservation and research organizations. The former include both land managing agencies such as BLM, the Forest Service, and DOD and regulatory agencies such as EPA together with the Fish and Wildlife Service, which has both roles.

What is the objective of *Partners in Flight?*

The title of the program, *Partners in Flight - Aves de las Americas*, highlights both the need for cooperation and the central role of the Latin American wintering grounds in any strategy to conserve these species. The objective of this program is to create the first integrated federal, state, and private program for research, monitoring, and habitat management for migratory nongame birds. The impetus for the program came from the concern, building for years, for declines in the populations of neotropical migratory birds — species that breed in North America and winter in Mexico, Central America, the Caribbean, and South America. The causes of these declines are complex and not fully understood, but habitat loss and related problems are key issues. International efforts will focus on Canada, a major breeding area, and Mexico, Central America, and the Caribbean, the major overwintering grounds. The strategy for this program is to stimulate cooperative public and private sector efforts involving public agencies at all levels, foundations, private organizations, and businesses in North America and the neotropics.

Some Examples of Neotropical Migrants*

Peregrine Falcon
Upland Sandpiper
Yellow-billed Cuckoo
Common Nighthawk
Chimney Swift
Rufous Hummingbird
Willow Flycatcher
Cliff Swallow
House Wren
Swaison's Thrush
Solitary Vireo
Yellow Warbler
Common Yellowthroat
Summer Tanager
Blue Grosbeak
Chipping Sparrow
Boblink
Yellow-headed Blackbird
Northern Oriole

* Selected from *Partners in Flight* preliminary list of over 250 species.

How can you help?

Because many of these species depend upon aquatic habitats for some or all of their life functions—and all depend upon clean water for drinking—water program managers can make a vital contribution to this effort. Clearly one of the most direct linkages is through our efforts to protect coastal resources, wetlands, lakes, stream and river habitats, and riparian zones. Programs such as the National Estuary Program, Near Coastal Waters Program, Section 404 Program, Clean Lakes Program, the "Great Water Bodies" programs, and other watershed protection projects provide important vehicles to protect both the physical and chemical integrity of these systems. However, water program people can also be critical members of the team through activities involving all facets of permitting and enforcement, development and application of criteria and standards, construction and operation of waste- and stormwater treatment systems, protection of ground water resources, monitoring, and water quality planning. Each of these contributes incrementally to maintaining the environmental quality necessary to sustain these populations and species.

For the most part, the best way to help is simply to continue to do what we do best; that is, managing aquatic resources in a manner that retains their integrity and natural functions. However, knowledge of the special needs of neotropical migratory birds is also important in helping to protect or enhance those aquatic system attributes that are most critical to supporting such species. One of the key challenges for program participants is to collect, analyze, package, and disseminate information on these bird species and their management needs.

How will *Partners in Flight* help water programs?

Looking at this effort from the opposite perspective, we should realize that increased interest in bird conservation will also help us to better marshall the resources and public support we need to protect aquatic resources since people have strong emotional ties to wild birds. Thus, they are more likely to rally to their protection, with spillover benefits for water quality and aquatic habitats, than for some of the less tangible benefits or more complex and obscure attributes of aquatic systems.

What is the organizational structure of *Partners in Flight?*

The program currently operates through four domestic **regional** workgroups and five **national** groups organized around functional areas (monitoring, research, legislation, information and education, and international activities.) A Caribbean working group will probably be established this year. Water program managers and staff at all levels are encouraged to become familiar with the program and to participate in appropriate working groups or activities. For more information on the program and working groups, contact Peter Stangel, National Fish and Wildlife Foundation, 18th and C Streets NW, Washington DC 20240.

Within EPA, we have established an ad hoc work group to help focus and coordinate EPA efforts on behalf of the Partners in Flight Program. Mike Slimak (ORD/OEPER), Anne Barton (OPPTS/OPP), and Dave Davis (OW/OWOW) lead the workgroup and serve as official members of the interagency Steering Committee for the Partners programs. Mike Troyer (ORD/OTTRS) serves as Executive Secretary of the group and principal contact with the other agencies and organizations. EPA Water Program personnel interested in the program are encouraged to contact Dave Davis (FTS 260-7166) or Janet Pawlukiewicz (FTS 260-9194) for further information or to share ideas.

April 1992

United States
Environmental Protection
Agency

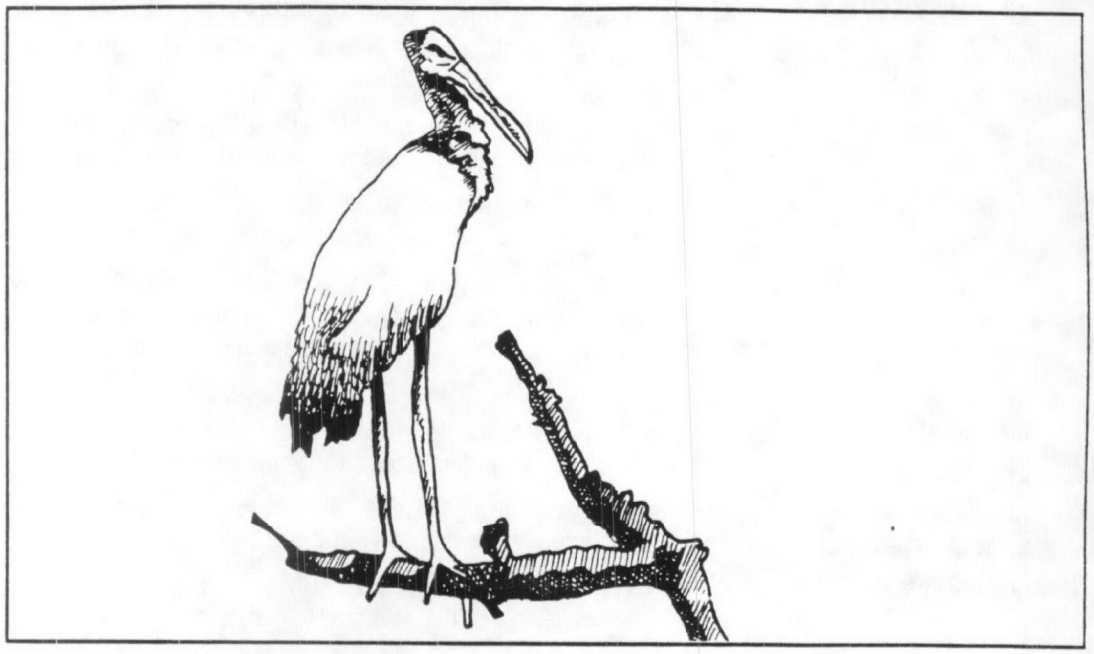
Pesticides and
Toxic Substances
(H7506C)

January 1992

EPA

Endangered Species Facts

States in which the wood stork is found.



Wood Stork

The wood stork is an *endangered species*. Endangered species are plants and animals that are in immediate danger of becoming extinct. *Threatened species* are plants and animals whose numbers are so low that they may become endangered in the near future. Pesticide use is one of the many factors that can jeopardize the survival of an endangered or threatened species. To monitor the use of pesticides in the areas where endangered or threatened species live, the U.S. Environmental Protection Agency (EPA) established the Endangered Species Protection Program.

What Is the Wood Stork?

- **Scientific Name**—*Mycteria americana*
- **Appearance**—The wood stork is a large, long-legged bird with a featherless gray head, white feathers covering most of its body, and black feathers at the tips of its wings and tail.
- **Reproduction**—Between November and May, the female lays two to five eggs in large nests constructed in swamps. The eggs hatch after about 30 days, and 9 weeks later the young are ready to leave the nest.
- **Feeding Habits**—The stork holds its partially open beak underwater to catch its prey, which includes fish, insects, small amphibians, reptiles, mammals, and other birds.
- **Special Characteristics**—The stork can fly at high altitudes and can coast for miles on air currents without flapping its wings, thereby saving energy.
- **Range**—The stork lives in wetland areas of Florida, Georgia, and South Carolina.

How Is the Wood Stork Threatened?

- **Habitat Loss**—Loss of wetlands in the Southeast has limited the wood stork's habitat.
- **Reduced Food Supply**—Activities that disturb wetlands, such as canal building, logging, and recreational activities, reduce the stork's food supply.
- **Pesticides**—The use of pesticides in or near aquatic areas can contaminate or further reduce the stork's food supply.

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What Is Being Done to Prevent Extinction of the Wood Stork?

- **Listing**—The wood stork was listed as an endangered species in 1984.
- **Recovery Plan**—The U.S. Fish and Wildlife Service has developed a recovery plan describes the actions considered necessary to conserve this species.
- **Research**—Information is being gathered on the population dynamics, biology, and migration of the stork to better understand what will be necessary to save the species.
- **Habitat Protection**—The U.S. Fish and Wildlife Service, state agencies, and local environmental groups are maintaining and improving existing stork feeding areas. State and federal agencies also are monitoring water development activities to protect the stork's habitat.
- **Reintroduction**—Suitable feeding grounds are being identified so that the stork may be reintroduced into these areas in the future.
- **Public Education**—The U.S. Fish and Wildlife Service and private organizations are developing public awareness programs to explain the plight of the wood stork and to link its survival to the health of wetlands in the United States.

What Can I Do to Help Prevent Extinction of Endangered Species?

- **Read EPA Publications**—Read and follow the instructions in the County Bulletins and Interim Pamphlets issued for your area by EPA's Endangered Species Protection Program.
- **Use Pesticides Wisely**—Use pesticides sparingly and only when necessary. Always read pesticide labels carefully and follow directions for use.
- **Write**—Write to EPA, the U.S. Fish and Wildlife Service, or your state fish and game agency or conservation department to learn more about endangered species.

How Can I Get More Information?

You can obtain a copy of the recovery plan by writing to:

Fish and Wildlife Reference Service
5430 Grosvenor Lane, Suite 110
Bethesda, Maryland 20814

For additional information on EPA's Endangered Species Protection Program, write to:

The Endangered Species Protection Program (H7506C)
U.S. Environmental Protection Agency
401 M Street, SW.
Washington, DC 20460

United States
Environmental Protection
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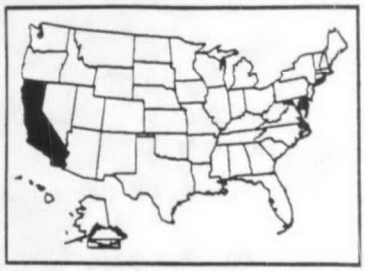
Pesticides and
Toxic Substances
(H7506C)

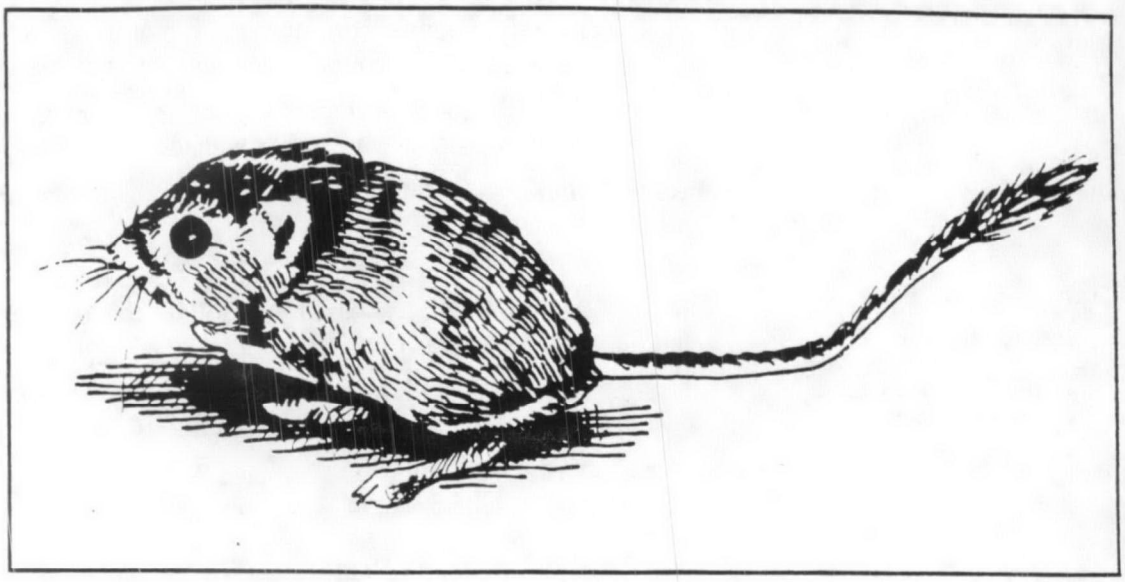
January 1992

EPA

Endangered Species Facts



States in which the Fresno kangaroo rat is found.



Fresno Kangaroo Rat

The Fresno kangaroo rat is an *endangered species*. Endangered species are plants and animals that are in immediate danger of becoming extinct. *Threatened species* are plants and animals whose numbers are so low that they may become endangered in the near future. Pesticide use is one of the many factors that can jeopardize the survival of an endangered or threatened species. To monitor the use of pesticides in the areas where endangered or threatened species live, the U.S. Environmental Protection Agency (EPA) established the Endangered Species Protection Program.

What Is the Fresno Kangaroo Rat?

- **Scientific Name**—*Dipodomys nitratoides exilis*
- **Appearance**—The Fresno kangaroo rat has short, stout front legs, long back legs, and a tail almost as long as its 5-inch body with a tuft of fur at its tip. A white stripe runs along each side of its buff-colored body, and it has a white stomach.
- **Reproduction**—Breeding generally occurs from February to June, and young are carried for 32 days. Mothers can have more than one litter per year.
- **Feeding Habits**—The rat forages for food at night and eats seeds, green plants, and insects.
- **Special Characteristics**—The rat is well adapted to the desert environment in which it lives. It uses its front legs to dig burrows, its back legs to rapidly hop over the sand, and its efficient kidneys to compensate for limited water availability.
- **Range**—The Fresno kangaroo rat lives in central California.

How Is the Fresno Kangaroo Rat Threatened?

- **Habitat Loss**—Agricultural development has destroyed much of the Fresno kangaroo rat's habitat.
- **Competition**—Heavy grazing by cattle limits food availability for the rat. Competition for food with other rodents also is a problem.
- **Off-Road Vehicles**—Use of off-road vehicles in the desert can destroy the rat's burrows and otherwise harm its habitat
- **Pesticides**—Although pesticides have not been identified as a cause for the rat's population decline, use of rodenticides and other pesticides in surrounding farmlands could harm remaining individuals.

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What Is Being Done to Prevent Extinction of the Fresno Kangaroo Rat?

- **Listing**—The Fresno kangaroo rat was listed as an endangered species in 1985.
- **Recovery Plan**—The U.S. Fish and Wildlife Service has developed a recovery plan describes the actions considered necessary to conserve this species.
- **Research**—Information about the rat's biological characteristics and habitat is being collected to better understand what actions will be necessary to help the species survive.
- **Habitat Protection**—The State of California is purchasing property with habitat suitable for this animal. In addition, the use of rodenticides in the rat's habitat is now prohibited.
- **Reintroduction**—Scientists are considering moving some Fresno kangaroo rats to rehabilitated areas.

What Can I Do to Help Prevent Extinction of Endangered Species?

- **Read EPA Publications**—Read and follow the instructions in the County Bulletins and Interim Pamphlets issued for your area by EPA's Endangered Species Protection Program.
- **Use Pesticides Wisely**—Use pesticides sparingly and only when necessary. Always read pesticide labels carefully and follow directions for use.
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November 1991

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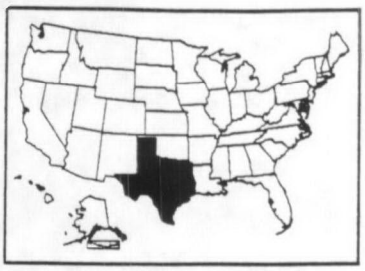
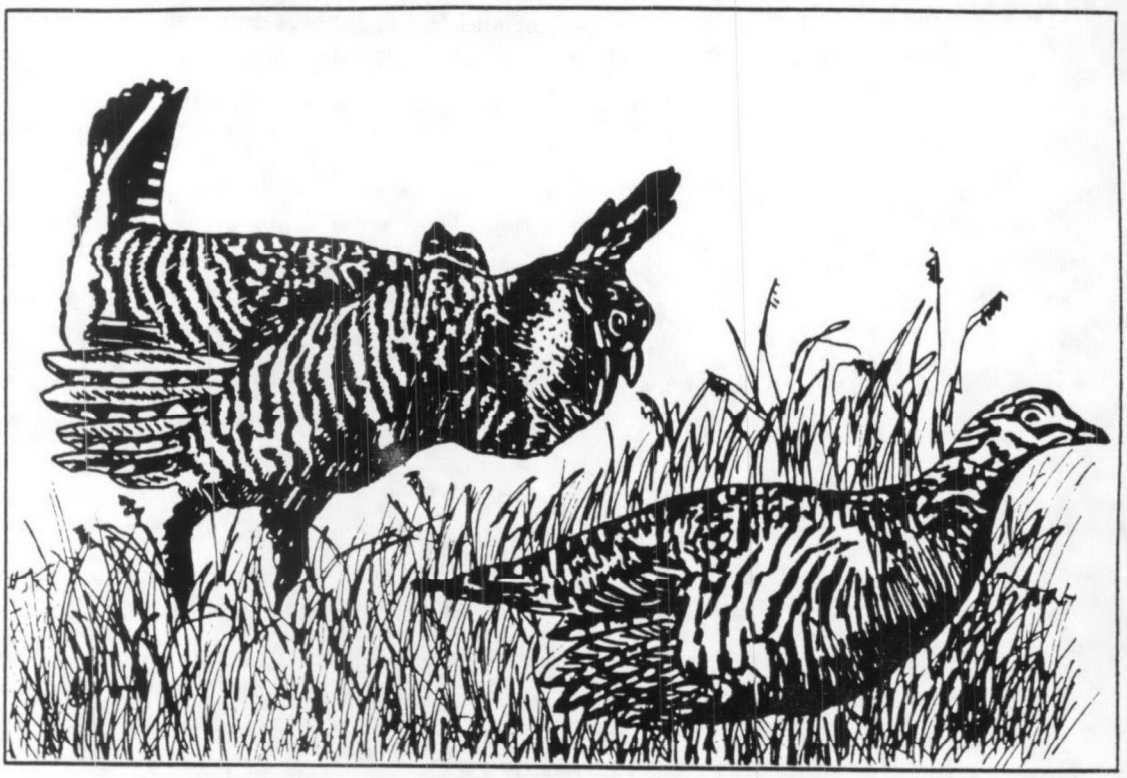
Endangered Species Facts



States in which the Attwater's prairie chicken is found.



Attwater's Prairie Chicken

The Attwater's prairie chicken is an *endangered species*. Endangered species are plants and animals that are in immediate danger of becoming extinct. *Threatened species* are plants and animals whose numbers are so low that they may become endangered in the near future. Pesticide use is one of the many factors that can jeopardize the survival of an endangered or threatened species. To monitor the use of pesticides in the areas where endangered or threatened species live, the U.S. Environmental Protection Agency (EPA) established the Endangered Species Protection Program.

What Is the Attwater's Prairie Chicken?

- **Scientific Name**—*Tympanuchus cupido attwateri*
- **Appearance**—The Attwater's prairie chicken's body is about 14 inches long and is covered with alternating bands of light and dark feathers, except for its bare ankles and feet.
- **Reproduction**—Mating occurs from March through May. Females then make nests and lay from 8 to 15 eggs, which hatch after 23 or 24 days of incubation.
- **Feeding Habits**—The bird prefers feeding on green plants (such as ruella, stargrass, and perennial ragweed), but also eats seeds and insects.
- **Special Characteristics**—In early spring, males try to attract females by strutting, calling, and puffing out pouches on their necks. The males gather together to perform this ritual in areas known as "booming grounds" because of the loud calls made by the males during courtship.
- **Range**—The Attwater's prairie chicken lives in the grasslands of the Gulf Central Prairie in Texas.

How Is the Attwater's Prairie Chicken Threatened?

- **Habitat Loss**—Expansion of local cities has destroyed much of the bird's habitat
- **Hunting**—Pheasant hunters often accidentally kill the Attwater's prairie chicken because it resembles the female pheasant.
- **Competition and Predations**—Competition with pheasants and other non-native birds, as well as predation by wild and domestic animals, has reduced the bird's numbers.
- **Pesticides**—Although the impact of pesticides on this species has not been determined, pesticide use has the potential to affect the Attwater's prairie chicken.

What Is Being Done to Prevent Extinction of the Attwater's Prairie Chicken?

- **Listing**—The Attwater's prairie chicken was listed as an endangered species in 1967.
- **Recovery Plan**—The U.S. Fish and Wildlife Service, in conjunction with state wildlife management agencies, has developed a recovery plan that describes the actions considered necessary to conserve this species.
- **Research**—Biologists are studying the bird to determine what its habitat needs are so that populations can be transplanted to other areas.
- **Habitat Protection**—The Fish and Wildlife Service regulates activities such as grazing and mining on federal lands where the Attwater's prairie chicken lives. Also, the Fish and Wildlife Service and state environmental agencies are setting aside lands for the bird.
- **Public Education**—Federal and state conservation agencies have implemented programs to educate the public about the Attwater's prairie chicken and its habitat requirements.
- **Hunter Education**—Federal and state game and wildlife agencies are teaching hunters how to identify the Attwater's prairie chicken.

What Can I Do to Help Prevent Extinction of Endangered Species?

- **Read EPA Publications**—Read and follow the instructions in the County Bulletins and Interim Pamphlets issued for your area by EPA's Endangered Species Protection Program
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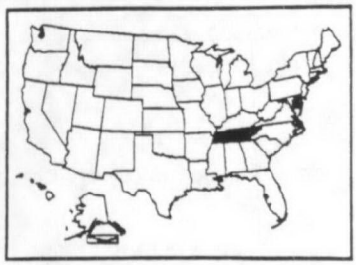

States in which the Tennessee purple coneflower is found.

Tennessee Purple Coneflower

The Tennessee purple coneflower is an *endangered species*. Endangered species are plants and animals that are in immediate danger of becoming extinct. *Threatened species* are plants and animals whose numbers are so low that they may become endangered in the near future. Pesticide use is one of the many factors that can jeopardize the survival of an endangered or threatened species. To monitor the use of pesticides in the areas where endangered or threatened species live, the U.S. Environmental Protection Agency (EPA) established the Endangered Species Protection Program.

What Is the Tennessee Purple Coneflower?

- **Scientific Name**—*Echinacea tennesseensis*
- **Appearance**—The Tennessee purple coneflower is a short, woody plant with pinkish-purple flowers that look like daisies.
- **Reproduction**—The plant flowers from June through October, and each flower produces a small number of seeds.
- **Special Characteristics**—Native Americans valued the plant for its numbing effects. It is now being studied by cancer and AIDS researchers for possible applications in combating these diseases.
- **Range**—The flower is found only in the cedar glades of central Tennessee.

How Is the Tennessee Purple Coneflower Threatened?

- **Habitat Loss**—Spreading residential and commercial development has destroyed much of the Tennessee purple coneflower's habitat.
- **Grazing and Mowing**—Grazing by domestic and wild animals, as well as field mowing, can damage the plant.
- **Reproductive Characteristics**—Since the plant produces few seeds and these are not dispersed widely, the plant's population growth is naturally limited.

What Is Being Done to Prevent Extinction of the Tennessee Purple Coneflower?

- **Listing**—The Tennessee purple coneflower was listed as an endangered species in 1979
- **Recovery Plan**—The U.S. Fish and Wildlife Service has developed a recovery plan describes the actions considered necessary to conserve this species.
- **Research**—Searches are being conducted to locate new coneflower colonies, and methods are being developed to remove seeds for establishing new experimental colonies without hurting the existing colonies
- **Habitat Protection**—Private landowners with coneflowers on their property have agreed not to disturb existing colonies Timber management practices that may hurt coneflower colonies have been prohibited on state-owned lands.
- **Reintroduction**—State organizations and private individuals are growing the plant and establishing new colonies on state-owned and private land.
- **Public Education**—Federal and state conservation agencies are conducting educational campaigns to inform people about the uniqueness and significance of the Tennessee purple coneflower.
- **Pesticides**—Although the impact of pesticides on this species has not been determined, pesticide use has the potential to affect the Tennessee purple coneflower.

What Can I Do to Help Prevent Extinction of Endangered Species?

- **Read EPA Publications**—Read and follow the instructions in the County Bulletins and Interim Pamphlets issued for your area by EPA's Endangered Species Protection Program.
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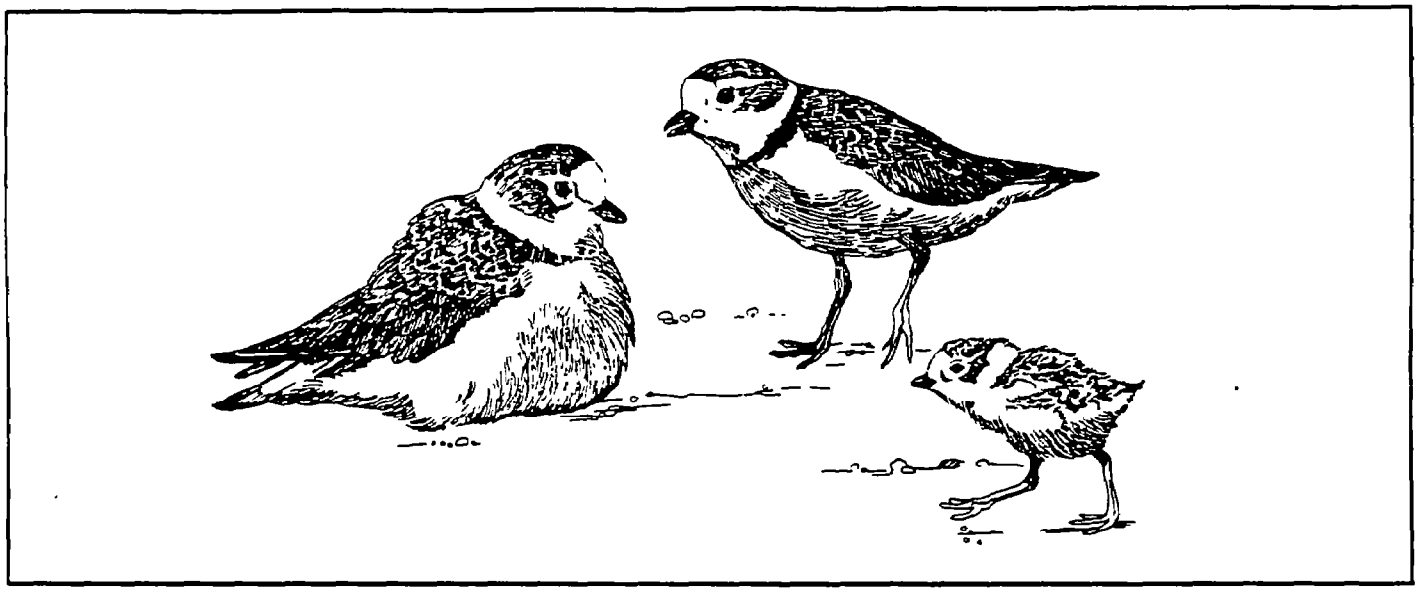
Endangered Species Facts

Piping Plover



Some plants and animals listed by the U.S. Fish and Wildlife Service as endangered or threatened can be harmed by the use of certain pesticides. To help ensure the continued existence of these species, the U.S. Environmental Protection Agency (EPA) will limit the use of certain pesticide products within the habitat of these species. This action will reduce the exposure of endangered or threatened species to potentially harmful pesticides. The piping plover is a bird for which EPA may set pesticide limitations.[1]

What Is the Piping Plover?

The piping plover (scientific name: *Charadrius melodus* Ord) is a small, stocky shorebird with sand-colored wings, white underparts, and orange legs and bill. The adult plover weighs around 2 ounces and is about 7 inches long. During the breeding season, distinct black stripes circle its breast and forehead, but these are obscure in winter and in young birds.

Plovers eat beetles, grasshoppers, fly larvae, and spiders in fields and along rivers and lakes, and marine worms, crustaceans, and clams along beaches. The birds prefer to feed near the water's edge.

From March to August, piping plovers breed on wide undisturbed beaches, bare sandy islands in rivers, riverbanks, and salt-encrusted sandy or pebbly areas along lakes and ponds The birds appear to need these open, undisturbed areas with little plant cover to successfully raise chicks. During their breeding season, piping plovers call melodiously, hence the description "piping" and the species name *melodus*.

Pairs of piping plovers may nest alone or in colonies of up to 30 pairs, and occasionally nest in colonies of other birds, such as American avocets or least terns. Both parents incubate the eggs, sitting on their small, shallow nests lined with small pebbles or broken shells for about one month, and defend their territory against intruders. Within 3 to 4 weeks after hatching, the young are ready to fly and fend for themselves. Although each pair lays four eggs in a nest and may nest four times a year, many of these chicks die. Often a pair will raise only two chicks a year, and sometimes no chicks live.

Piping plovers breed in three regions of North America: the Northern Great Plains of the U.S. and Canada, the Great Lakes beaches, and the Atlantic coast beaches. In the fall, the piping plover migrates south, and winters along the Gulf coast, the southern Atlantic coast from North Carolina to Florida, and some Caribbean islands.

Historical records show that the birds once nested in 14 states and wintered in 5; today piping plovers breed in only 8 states, and in all instances, the number of breeding pairs has decreased and the birds are found in fewer locations. Presently, only 4,300 to 4,450 piping plovers nest in North America. A 1986 survey found 2,700 to 2,850 in the northern Great Plains, and only 17 breeding pairs along the shores of the Great Lakes.

How Is the Piping Plover Threatened?

Habitat loss on both breeding and wintering grounds seriously threatens the plover. The plovers nest in habitat that can be destroyed easily by flooding and erosion.

[1] All three populations of piping plover that breed in North America are listed under the Endangered Species Act. This fact sheet describes only the Great Lakes and Northern Great Plains populations.

Because of this, the birds are susceptible to frequent nest destruction, and, consequently, have very low breeding success.

The plovers also face development pressures on both breeding and wintering grounds as rivers and beaches are increasingly used as sites for recreational activities, homes, or industries. Reservoirs, river channeling, and water-flow control measures have eliminated many sandbars in the Missouri and Platte Rivers, the main river systems used as breeding areas by piping plovers. These measures cause unnatural water flows that can flood nests when water levels are high. If water levels are kept low for long periods of time, riverbanks can become unsuitable for nesting because of encroaching vegetation. Management techniques that keep sandbars or barrier islands from washing away also encourage plant growth and make these areas unsuitable for nesting.

Plovers are sensitive to the presence of people and are easily scared off their nests, increasing the chances for predators (such as gulls, skunks, foxes, dogs, or cats) to attack the nestlings, or for the young to be separated from their parents. When people or other animals such as cattle walk through the plover's nesting areas, they can trample the nests, eggs, and chicks. Vehicles driving through the nesting areas also can crush nests.

Piping plovers can be harmed by pesticides either through direct contact or by eating contaminated insects or drinking contaminated water. Young plovers can absorb pesticides through their skin before they grow feathers, and both young and adult birds can ingest pesticides from preening contaminated feathers. Also, pesticides can kill many of the insects that the plovers feed on, so that they might not have enough food.

Other human activities that can harm the plovers include oil spills and mining. Oil spills can kill birds, but do not appear to be a major threat to the population. Mining can both help and harm the plover in that spoil piles create nesting habitat, but these piles are often disturbed by people or machines during the breeding season, resulting in the loss of some of the young raised there.

What Is Being Done to Prevent Extinction of the Piping Plover?

The U.S. Fish and Wildlife Service (FWS) officially listed the piping plover under the Endangered Species Act on December 11, 1985. The Northern Great Plains and Atlantic coast populations are listed as "threatened," while the Great Lakes population is listed as "endangered." FWS then began working with other government and private agencies to develop a recovery plan for the species. Recovery goals include a 70 percent increase in the Great Plains population and a tenfold increase in the Great Lakes population. These levels must then be maintained for 15 years.

The recovery plan identifies actions necessary to prevent extinction of the piping plover and to reach recovery goals. Priorities for the Great Lakes region are controlling predators and restricting human and vehicular access to breeding sites. The priority for the Northern Great Plains is better management of water flow on the Missouri and Platte Rivers. In both areas careful management and protection of breeding habitat is important. Protective measures include controlling human access to nesting areas, reducing predation, limiting residential and industrial development, and managing water flow to minimize the destruction of nests. Scientists will continue to attempt to make some areas more attractive to nesting pairs. Also EPA is considering limiting the use of certain pesticides in breeding and wintering areas.

Many states and private agencies have run successful public information campaigns to raise awareness of the plover's plight. Public support for their conservation is generally strong, and many encouraging efforts are underway to aid the plover's recovery.

Several cooperative research groups have been set up among federal and state agencies, university and private research centers, and the Canadian Wildlife Service. A major effort is planned in 1991 to survey the bird across its entire range, including the United States, Canada, Mexico, and the Caribbean. This will enable scientists to determine where plovers are breeding and wintering, estimate numbers, and monitor long-term changes in the population.

Scientists also plan to conduct additional research on habitat and food requirements and factors that contribute to low breeding success. Since the birds spend 7 months of the year along migration routes and on wintering habitat, a greater understanding of their movement patterns, distribution, and habitat requirements in these areas is important to ensure their survival.

Because the piping plover breeds and winters in several countries, its preservation requires an international effort. Canada's Committee on the Status of Endangered Wildlife lists the plover as endangered, and the Canadian Wildlife Service has developed a recovery plan that will complement U.S. efforts. The efforts of federal, state, and private agencies, and the support shown by the public, can do much to save the piping plover from extinction.

How Can I Obtain Additional Information?

To obtain copies of the recovery plan for the piping plover, contact:

Fish and Wildlife Reference Service
5430 Grosvenor Lane, Suite 110
Bethesda, Maryland 20814

For additional information on EPA's Endangered Species Protection Program, contact:

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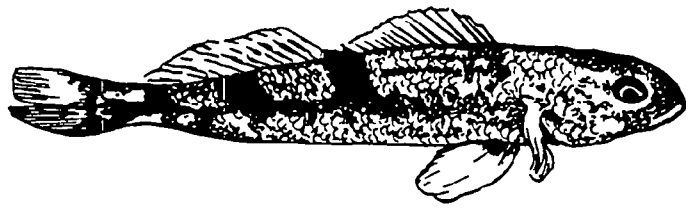
Endangered Species Facts

Snail Darter



Some plants and animals listed by the U.S. Fish and Wildlife Service as endangered or threatened can be harmed by the use of certain pesticides. To help ensure the continued existence of these species, the U.S. Environmental Protection Agency (EPA) will limit the use of certain pesticide products within the habitat of these species. This action will reduce the exposure of endangered or threatened species to potentially harmful pesticides. The snail darter is a threatened fish for which EPA may set pesticide limitations.

What Is the Snail Darter?

The snail darter (scientific name: *Percina tanasi*) is a small fish that was discovered in August 1973 in the Little Tennessee River and is found only in Loudon County, Tennessee. The top part of the snail darter is brown with occasional traces of green, and four dark brown "saddles" can be found behind its top (dorsal) fin. The sides of the fish are a lighter brown with dark blotches and the fish's belly is white.

Adult snail darters live in the shallow parts of streams and rivers, where water moves relatively swiftly and is cool and clear. The darter prefers waterways that have a gravel bottom. Snails form the bulk of the darter's diet, but the fish also eats water insects.

The snail darter spawns from mid-winter through mid-spring. The eggs hatch within 18 to 20 days and the young fish (called fry) drift with the water current to nursery areas downstream. After about 5 to 7 months, the young darters begin to migrate back to the upstream spawning areas where they spend the rest of their lives. The maximum life span for the snail darter is estimated to be 4 years.

The snail darter is famous for almost stopping the construction of the Tennessee Valley Authority (TVA) Tellico Dam and Reservoir Project on the Little Tennessee River. Construction of this dam began in 1967 and was partially completed when the U.S. Fish and Wildlife Service listed the snail darter as endangered on October 9, 1975. A citizens' group filed suit against the TVA to halt construction on the grounds that further construction would violate the Endangered Species Act by destroying the only known habitat of the snail darter.

The case was argued to the U.S. Supreme Court which agreed that the Tellico Dam project violated the Endangered Species Act. However, the Court also recognized the conflict between the Act and necessary water control projects and stated that Congress must resolve such conflicts as they occur. In the case of the snail darter, Congress decided that the Tellico Project was exempt from the Endangered Species Act and the project could continue. This decision also meant that the snail darter would be eliminated from the Little Tennessee River.

Before its original habitat was destroyed, some of the darters from the Little Tennessee River were transplanted to several nearby streams. Those fish transplanted to the Hiwassee River appear to be surviving. Since 1979, several small groups of the fish were found in other streams, adding to the entire population of the snail darter. However, even though its numbers have increased, the snail darter's existence is still threatened.

How Is the Snail Darter Threatened?

Because the overall number of snail darters is very small, the death of even a few could deplete the population beyond recovery and the species would become

extinct. Water pollution, river dredging, or development can all threaten snail darter survival. For example, the snail darter lives in the Chickamauga River, which has a long history of pollution problems from industrial and sewage wastes that result in frequent fish kills.

River dredging presents another threat since it removes gravel that both supports animals the darter feeds on and provides a spawning area for the fish. The snail darter survives best in clear water, but construction near rivers or streams may make the water muddy. Finally, because so few snail darters exist, collectors may want to add the fish to their collections before it becomes extinct, shrinking the natural population even further. Because the existence of the snail darter is already precarious, such threats could easily destroy the species.

What Is Being Done to Prevent the Extinction of the Snail Darter?

The snail darter was originally classified as endangered because it was believed that the Tellico Dam project would eliminate the species. After the fish was transplanted and other snail darters were discovered living naturally in other streams, the U.S. Fish and Wildlife Service (FWS) reclassified the fish as threatened. The snail darter was not removed entirely from the endangered or threatened species list because of the vulnerability of its habitat. The snail darter still receives the same amount of protection as it did when considered endangered, but more people can receive permits from FWS to collect the fish.

FWS has prepared a recovery plan that outlines how the snail darter habitat should be managed to protect and increase the numbers of the fish. One of the suggested steps is to inventory the area's streams to find other snail darters and to determine how well those fish are surviving and reproducing. If possible, biologists may change the snail darter's habitat to improve the fish's ability to live there.

The recovery plan also suggests that present and foreseeable threats to the snail darter be determined and minimized or eliminated. For example, organizations polluting the area's streams and rivers may be asked to reduce their wastes to protect the darter and other wildlife.

Also, FWS must make sure that there are no proposed or planned projects that could adversely impact the fish. This step is very dependent on the support of local business communities and governments that have a direct impact on the snail darter habitat. As biologists learn more about the fish and parts of the streams that it prefers, they can inform developers who may then try to avoid these special areas. In addition, through the help of EPA, the use of any pesticides that may harm the snail darter could be limited in the fish's habitat.

How Can I Obtain Additional Information?

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Fish and Wildlife Reference Service
5430 Grosvenor Lane, Suite 110
Bethesda, Maryland 20814

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December 1990

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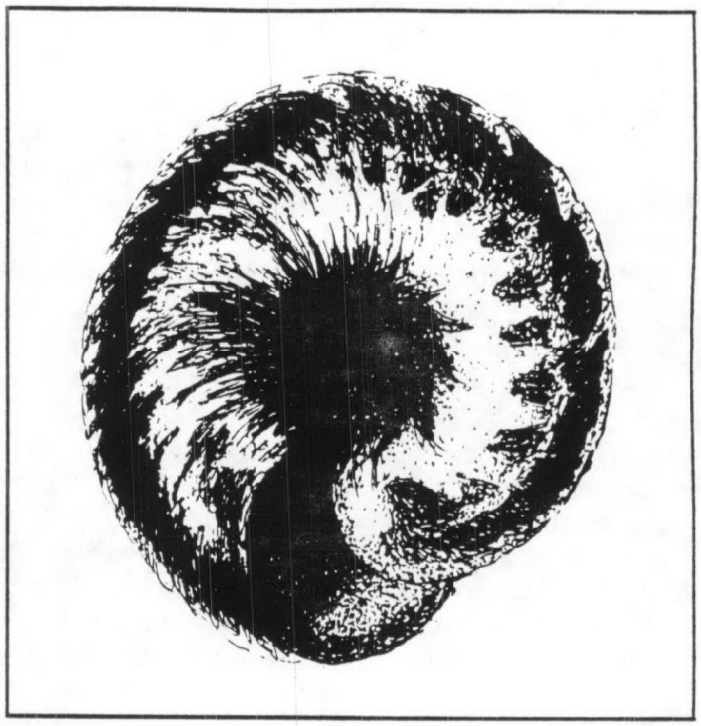
Endangered Species Facts

Painted Snake Coiled Forest Snail

Some plants and animals listed by the U.S. Fish and Wildlife Service as endangered or threatened can be harmed by the use of certain pesticides. To help ensure the continued existence of these species, the U.S. Environmental Protection Agency (EPA) will limit the use of certain pesticide products within the habitat of these species. This action will reduce the exposure of endangered or threatened species to potentially harmful pesticides. The painted snake coiled forest snail is a threatened animal for which EPA may set pesticide limitations.



What Is the Painted Snake Coiled Forest Snail?

The painted snake coiled forest snail (scientific name: *Anguispira picta*) is a small, dome-shaped land snail, with a shell approximately two-thirds of an inch in diameter and one-third of an inch high. The painted snake coiled forest snail can be distinguished from other land snails by the irregular chocolate blotches on the top and indistinct flame-shaped markings on the underside of its cream-colored shell. The edge of the shell is smooth and white.

The snail lives on moist limestone rocks and in crevices in a single cove in southern Tennessee, at elevations between 750 and 930 feet. The snail needs a humid environment and dense forest cover to survive. The snail's specialized habitat requirements limit its total habitat to a mere 325 acres.

Biologists know very little about the snail's ecology, population dynamics, and life cycle. The snails seem to be more active after a rain, at night, or in cooler weather. They may become dormant, or inactive, when the weather remains dry for long periods of time. Biologists think that the snails eat lichens growing on the limestone and that, in turn, the snails may be eaten by small mammals, beetles, and beetle larvae. The total number of individual painted snake coiled forest snails is uncertain but may range from 2,000 to 20,000.

Biologists know little about how the painted snake coiled forest snail reproduces, but they do know that related species of land snail lay their eggs in the soil and reach maturity 2 to 3 years after hatching. Although severely restricted by specialized habitat requirements, the snail appears to be reproducing in undisturbed areas, as biologists have found both young and old snails living in some parts of the cove.

How Is the Painted Snake Coiled Forest Snail Threatened?

Restriction to a single location, loss of habitat, and overcollection are the major threats to the painted snake coiled forest snail. Any species limited to a single location is particularly vulnerable if natural or human disturbance of its habitat occurs. A major forest fire or extensive grazing, logging, or limestone quarrying in the area could completely destroy the population and therefore the species. If there were other populations of the snail, its chances for survival would be more secure.

Logging and grazing degrade the snail's habitat by removing plants, thus making the habitat too dry. Some parts of the cove where the snail lives were logged or grazed in the past; if this is resumed, additional critical habitat could be lost, and snails that now live in these areas may die. In addition, quarrying, which is prevalent in southern Tennessee, threatens all the remaining snails, as this activity would destroy the limestone outcrops on which they live.

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Shell collectors eager to have a rare specimen of the painted snake coiled forest snail also threaten the species. Because so few snails are left, collecting even a small number could pose a significant threat to the population.

What Is Being Done to Prevent Extinction of the Painted Snake Coiled Forest Snail?

The U.S. Fish and Wildlife Service officially listed the painted snake coiled forest snail as threatened on July 3, 1978, and began developing a recovery plan for the species. Since a single cove harbors the only known population of the snail, protection of this cove from further disturbance is essential. The recovery plan attempts to ensure this protection and also calls for population monitoring and restrictions on collecting. These restrictions will apply to both scientific and amateur collecting.

To help protect the snail from harmful exposure to pesticides, EPA will assess the impact of pesticides on the snail and will place limitations on those that may harm this species either directly or through modification of the habitat on which it depends.

The Tennessee Wildlife Resources Agency, The Nature Conservancy, and the Fish and Wildlife Service hope to either obtain a conservation agreement with area landowners or actually acquire land to protect the snail's habitat. The cove spans four important land parcels. Mineral rights to one large parcel of land were sold to a private party in 1982. The three agencies will attempt to forestall any exploration or quarrying of this parcel.

Trees were harvested on another parcel about 15 years ago. Although resumption of logging does not appear to be imminent, a conservation agreement or land acquisition would prevent further logging. Up until now, the family owning the parcel containing most of the cove has protected the snail's habitat by not allowing quarrying or logging. However, until a written conservation agreement is signed, the habitat won't be considered completely safe from logging or quarrying activities.

Biologists are conducting surveys as part of the recovery plan to provide information on changes in the population. They plan to continue monitoring total numbers and population fluctuations to discern any significant drop in population. Scientists will also look for new populations of the snail. If other populations are discovered, not only would this add to the total known numbers of the snail, but any destruction of the snail's habitat would endanger only one population of the snail, not the entire species.

To fully protect the species, biologists also need information on reproduction, behavior, food and habitat requirements, natural threats such as predation and climate change, and competition with other species of snails. The painted snake coiled forest snail is part of a widespread family of snails, some of which also live in the cove. Understanding what makes other snails succeed would help scientists manage the existing populations of the painted snake coiled forest snail to ensure that the species does not become extinct.

How Can I Obtain Additional Information?

To obtain copies of the recovery plan for the painted snake coiled forest snail, contact:

Fish and Wildlife Reference Service
5430 Grosvenor Lane, Suite 110
Bethesda, Maryland 20814

For additional information on EPA's Endangered Species Protection Program, contact:

The Endangered Species Protection Program (H7506C)
U.S. Environmental Protection Agency
401 M Street, SW.
Washington, DC 20460

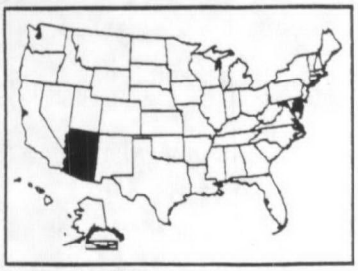
United States
Environmental Protection
Agency

Pesticides and
Toxic Substances
(H7506C)

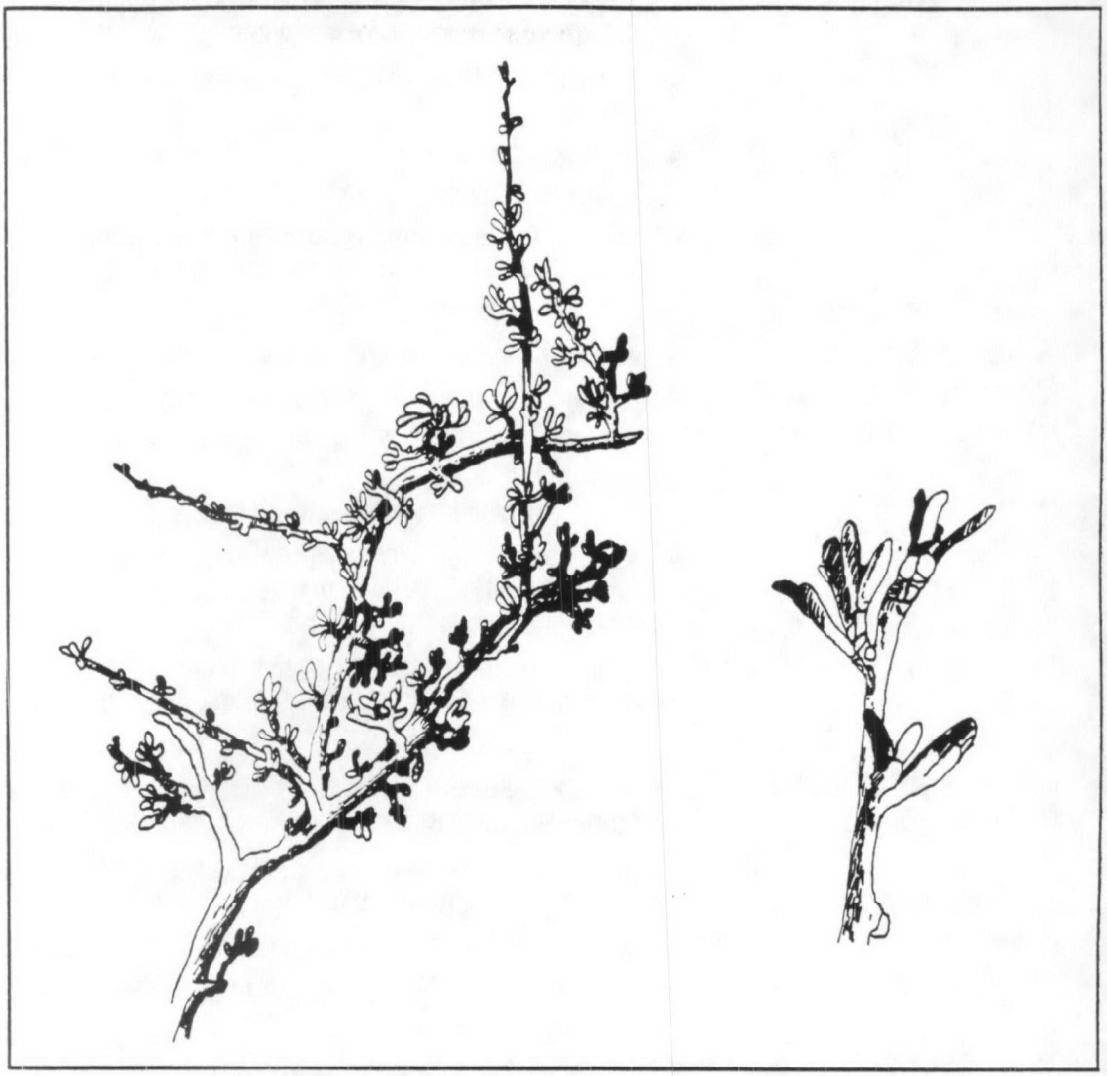
January 1992

EPA

Endangered Species Facts



States in which the Arizona cliffrose is found.



Arizona Cliffrose

The Arizona cliffrose is an *endangered species*. Endangered species are plants and animals that are in immediate danger of becoming extinct. *Threatened species* are plants and animals whose numbers are so low that they may become endangered in the near future. Pesticide use is one of the many factors that can jeopardize the survival of an endangered or threatened species. To monitor the use of pesticides in the areas where endangered or threatened species live, the U.S. Environmental Protection Agency (EPA) established the Endangered Species Protection Program.

What Is the Arizona Cliffrose?

- **Scientific Name**—*Cowania subintegra*
- **Appearance**—The Arizona cliffrose is a low, evergreen shrub that stands up to 3 feet high. It has gray, shredded bark; narrow, fuzzy leaves that are green on top and white underneath; and yellow or white flowers.
- **Reproduction**—The cliffrose reproduces from seeds that are formed by its flowers.
- **Special Characteristics**—The plant can live in very dry, sandy soils.
- **Range**—The plant grows on the northern edge of the Sonoran Desert in Arizona.

How Is the Arizona Cliffrose Threatened?

- **Grazing**—Grazing by domestic livestock and wildlife can harm the Arizona cliffrose. Young seedlings and flowers are particularly susceptible to grazing.
- **Construction and Mining**—Highway construction and upkeep, maintenance of gas pipe. and high-voltage powerlines, and mining activities can damage or uproot the plant.
- **Off-Road Vehicles**—The use of off-road vehicles in the cliffrose's habitat can harm the plant.
- **Herbicides**—The use of herbicides to improve grazing lands, or to remove vegetation from rights-of-way, may threaten the plant.
- **Inbreeding**—Inbreeding is occurring as the population declines. Weak seeds and plants are produced more frequently because of inbreeding.

What Is Being Done to Prevent Extinction of the Arizona Cliffrose?

- **Listing**—The Arizona cliffrose was listed as an endangered species in 1984.
- **Recovery Plan**—The U.S. Fish and Wildlife Service has developed a recovery plan that describes the actions considered necessary to conserve this species.
- **Research**—Scientists are studying the lifecycle, habitat, and ecological requirements of the Arizona cliffrose to determine ways to help protect the plant.
- **Habitat Protection**—The Fish and Wildlife Service has developed plans to protect the plant on federal lands. Federal and state laws that regulate mining, grazing, and off-road vehicle use also are being enforced to protect the plant.
- **Public Education**—The Fish and Wildlife Service is producing educational publications describing the wildflower and informing the public on how it can be protected.

What Can I Do to Help Prevent Extinction of Endangered Species?

- **Read EPA Publications**—Read and follow the instructions in the County Bulletins Interim Pamphlets issued for your area by EPA's Endangered Species Protection Progran
- **Use Pesticides Wisely**—Use pesticides sparingly and only when necessary. Always read pesticide labels carefully and follow directions for use.
- **Write**—Write to EPA, the U.S. Fish and Wildlife Service, or your state fish and game agency or conservation department to learn more about endangered species.

How Can I Get More Information?

You can obtain a copy of the recovery plan by writing to:

Fish and Wildlife Reference Service
5430 Grosvenor Lane, Suite 110
Bethesda, Maryland 20814

For additional information on EPA's Endangered Species Protection Program, write to:

The Endangered Species Protection Program (H7506C)
U.S. Environmental Protection Agency
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United States
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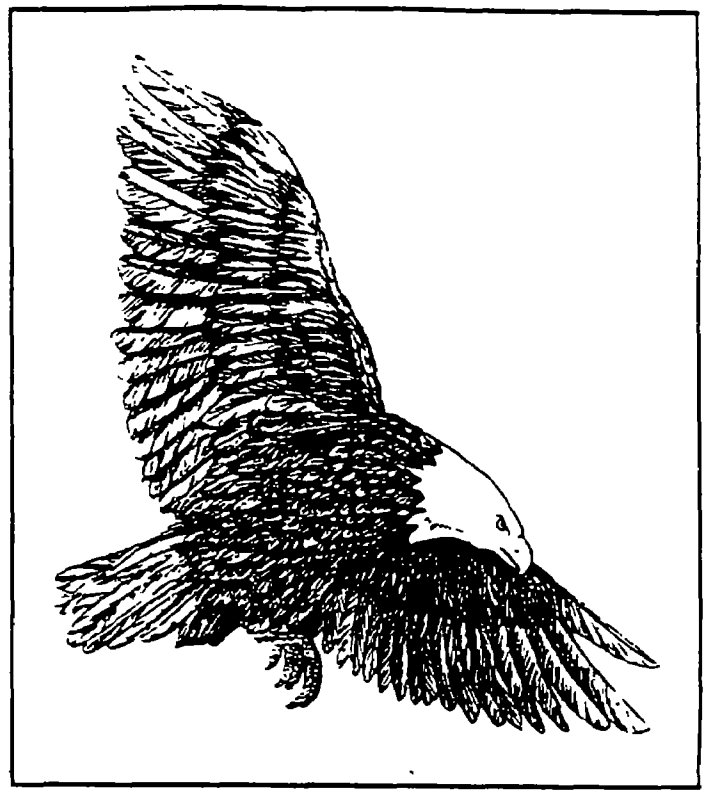
Endangered Species Facts

Bald Eagle

Some plants and animals listed by the U.S. Fish and Wildlife Service as endangered or threatened can be harmed by the use of certain pesticides. To help ensure the continued existence of these species, the U.S. Environmental Protection Agency (EPA) will limit the use of certain pesticide products within the habitat of the species. This action will reduce the exposure of endangered or threatened species to potentially harmful pesticides. The bald eagle is an endangered bird for which EPA may set pesticide limitations.



What Is the Bald Eagle?

The bald eagle (scientific name: *Haliaeetus leucocephalus*) is well known as the national bird and a symbol of the United States, appearing on currency, federal seals, and official documents. Although most people are familiar with the appearance of this 2 1/2- to 4-foot long dark brown bird with white head and tail, few have seen one in the wild. The bald eagle formerly lived throughout North America, but it now nests primarily in Alaska, Canada, the Pacific Northwest, the Great Lakes, Florida, and Chesapeake Bay. The bald eagle prefers coasts, rivers, large lakes, and extensive marshlands. In winter, its range may extend further inland and include some mountainous areas.

Bald eagles generally nest in the same area year after year and may even use the same nest, repairing it and adding new materials for reinforcement. Usually, an eagle will choose one of the largest trees in a territory for nesting. The tree must not only support the nest, which may be as large as 5 feet in diameter, but also offer a view of potential feeding areas. Eagles also require a large territory, so nests are often built a mile or more apart. In a stable population, an average of one eaglet is raised by a pair of eagles each year.

Eagles feed primarily on fish and waterfowl, but may eat rabbits and other small mammals, especially during migration or in winter, when water is frozen over. Relying on scavenging for much of their food, eagles also occasionally eat deer and other big game carrion, as well as ducks and geese that are crippled or dying from gunshot wounds.

What Threatens the Bald Eagle?

Loss of habitat is the biggest long-term threat to bald eagle populations throughout the United States. Because these birds need such large territories to breed successfully, human activities, including agriculture, logging, mining, and urban development, have seriously depleted potential habitat. Shooting has been a frequently recorded cause of death among bald eagles. Despite the eagle's prestige as a national symbol, hunters and farmers often shoot the birds because they consider them threats to livestock or game. However, eagles rarely, if ever, attack healthy livestock or big game. Between 1978 and 1981, 19 percent of dead eagles examined nationwide had been killed by gunshot wounds.

Environmental contaminants also pose a major threat to the bald eagle. Pesticides, particularly dichlorodiphenyl trichloroethane (DDT) and polychlorinated biphenyls (PCBs), can prevent eagles from reproducing by causing their eggshells to be so thin that they break before the young are hatched. Since the

early 1970s, when the use of DDT and similar pesticides was stopped, reproductive rates in some populations have improved. Other pesticides, however, are still found in dangerous levels in eagles in many areas. The bald eagle is also susceptible to lead poisoning since a significant part of its diet can consist of waterfowl injured or killed by lead shot. Pest control programs that use cyanide and strychnine to eliminate ground squirrels or other mammals from rangelands often indirectly affect the bald eagle as well. When eagles scavenge on these carcasses, they too are poisoned.

Other causes of bald eagle deaths include accidental trapping, entanglement in fishing lines, collisions with aircraft, and electrocution. Eagles may be electrocuted when they collide with electrical power or distribution lines; young birds that have not developed their flight skills are especially vulnerable.

What Is Being Done to Prevent Extinction of the Bald Eagle?

The bald eagle was first protected under the 1940 Bald Eagle Protection Act, and has since received protection under many state laws. In 1967, the U.S. Fish and Wildlife Service (FWS) listed the Southern bald eagle as an endangered species and on February 14, 1978, the bald eagle was listed as endangered or threatened in the conterminous United States, except in Washington, Oregon, Minnesota, Wisconsin, and Michigan, where it is is listed as threatened.

Recovery plans have been developed for five regions of the United States identified as recovery areas: the Pacific States, the Southeast, the Southwest, the Northern States, and Chesapeake Bay. The goal of each recovery plan is to increase the bald eagle population within states where it is endangered to levels at which its status can be considered threatened.

The greatest single focus of recovery efforts is to identify and preserve habitat essential for bald eagle breeding, roosting, and foraging. FWS is mapping and monitoring current bald eagle nesting sites and evaluating potential habitat for land acquisition. In conjunction with the U.S. Forest Service, FWS has also written guidelines for bald eagle nesting habitat, which have been implemented in timber management programs by timber companies and the Bureau of Land Management. These guidelines discuss the features of critical habitat areas, including the types of trees eagles need for nesting and perching, so that timber harvesters will not disturb these areas. In addition, private organizations have intervened to purchase land where specific populations have been threatened.

Many steps are being taken to reduce direct threats to bald eagle populations. Federal and state agencies have increased enforcement of existing regulations against killing eagles or disturbing eagle nests. For information leading to the conviction of persons who have shot ea the National Wildlife Federation offers a $500 rewar addition, specific groups, such as the Glacier Natural History Association, have instituted "crime stopper" programs to reduce poaching and prosecute violators.

Electrical companies also have taken steps to enforce suggested guidelines for raptor protection on their distribution lines, and to study the impacts of power line collisions on eagles and other birds of prey. Recent research into the birds' diet and behaviors have also helped to determine the effects of pesticides and other contaminants on eagles. With the aim of restricting harmful contaminants, EPA regularly provides data to FWS regarding chemicals' potential risk to the bald eagle.

Efforts to inform the public about bald eagle conservation and natural history have been widespread and are an integral part of the recovery program. State and federal resource management agencies and local conservation organizations have prepared fact sheets, posters, brochures, slide and lecture programs for schools, and radio and television announcements. National newspapers also have published articles about important eagle populations.

In addition to educating the general public, fed and local agencies have geared materials to hu landowners, and other groups who may have a direct impact on eagle populations or habitat. In a pairing of wildlife conservation with conservation of the nation's heritage, National Bald Eagle Day was declared on June 20, 1982. On this date 200 years ago, the bird was officially designated as the country's national symbol.

How Can I Obtain Additional Information?

To obtain copies of the recovery plan for the bald eagle, contact:

Fish and Wildlife Reference Service
5430 Grosvenor Lane, Suite 110
Bethesda, Maryland 20814

For additional information on EPA's Endangered Species Protection Program, contact:

The Endangered Species Protection Program (H7506C)
U.S. Environmenta' Protection Agency
401 M Street, SW.
Washington, DC 20460

5

View from USDA

Farms only five miles apart may need different solutions.

by James R. Moseley

What do you get when you put a NASA space scientist, a soil scientist, and a Mississippi catfish farmer in the same room? You get an example of how American farmers and ranchers are working diligently to protect and improve our nation's water supply.

Truman Roberts, a catfish farmer from southern Mississippi, wanted to find a better way to filter nutrients and waste from his catfish ponds. He turned to a scientist from NASA who had been using plant roots to filter and treat wastewater generated during space travel and to a Soil Conservation Service (SCS) scientist, who knew how to build a filtering system that would accommodate the local Mississippi soil and water conditions. Together, working with Roberts, they constructed a wetland to serve as a catfish pond filtering system.

Roberts and the scientists agree the filter works. The wetland system has improved water quality, increased fish production, improved fish flavor, reduced disease, increased wildlife habitat, and saved ground water, money, and energy. It's been so successful he is planning to build four more to take care of his entire 60 acres of catfish ponds.

This is just one illustration of the innovations the U.S. Department of Agriculture (USDA) and agricultural producers are using to improve the quality of our nation's water. It's also a good example of how farmers and ranchers are voluntarily incorporating soil and water resource management practices into their operations.

Agricultural producers share the nation's concern for the quality of our natural resources. No other segment of our society has a more direct and dependent relationship with the environment than farmers and ranchers. Producers understand they have a special responsibility to protect our water supply from pollution that may occur because of particular agricultural production practices. Farmers and ranchers have not gone out and deliberately damaged the environment for the sake of improving their farm income. If environmental damage has occurred, it has happened because of lack of knowledge of the problem and counterproductive U.S. farm policy.

Although ground-water contamination from agricultural chemicals and fertilizers is not a serious health threat, when the USDA and the industry hear of an agricultural water quality problem, it's taken seriously.

USDA and its agencies (Agricultural

Tim McCabe photo, Soil Conservation Service

Analyzing soil for nitrogen content helps determine the amount of fertilizer needed.

(Moseley is Assistant Secretary of Agriculture for Natural Resources and Environment.)

THE ISSUES AND THE POLICY

Stabilization and Conservation Service, Soil Conservation Service, Agricultural Research Service, Cooperative State Research Service, and the Extension Service), working in partnership with agricultural producers, are aggressively attacking water quality issues through research, education, technical assistance, and cost-sharing programs.

The major purpose of USDA's water quality programs is to provide producers with the information necessary to voluntarily adopt improved, environmentally sound management practices that do not sacrifice farm profitability. Two key principles guide the Department in developing these programs: Conduct state-of-the-art scientific research and develop effective farm policy and programs that can practically be used by farmers and ranchers.

Agricultural nonpoint-source pollution is best treated by modifying farm practices that may potentially threaten natural resources. USDA research efforts for managing nonpoint problems are focused on "source reduction." Regardless of what the "source" is—chemical applications, fertilizers, or animal waste—USDA research strategies center on developing and improving cost-effective crop and animal production technologies that reduce the contamination source.

Significant progress is being made in reducing potential agricultural contamination sources. One promising development in controlling agricultural nutrients from entering ground and surface water is nutrient management programs.

Precise measurement of nutrient content and prescription application is becoming standard operating procedure on farms all across the country. In managing animal waste and fertilizer applications, farmers are paying special attention to calibration rates in an effort to apply only what is required of a crop for growth in specific crop cycle. This is especially important with nitrogen because excess free nitrogen unused by a crop can move off site or into ground water.

In the Chesapeake basin three-state area (Pennsylvania, Virginia, and Maryland), over 114,000 acres are currently covered by nutrient management plans. Since the statewide management plans have been incorporated into the farming operations, 1,797 tons of nitrogen and 2,006 tons of phosphorus have been prevented from entering the bay. Fertilizer sales in the three bay states have decreased by 24 percent, while nationally sale of fertilizers have dropped by 16 percent.

New technology is being developed that will measure soil productivity and calibrate fertilizer rates at the point of application according to the soil's productivity. This technological breakthrough will increase nutrient consumption by the crops and reduce the potential for leaching or runoff of the plant food.

Computers, electronics, and satellites are being integrated into farm equipment for more precise measuring of inputs. In Missouri, three grower cooperatives are experimenting on 10,000 acres of cropland with truck-mounted computers, lasers, infrared photography, and soil tests to precisely apply only the amount of nutrients and herbicides needed as the truck moves across the field. Very little or no excess chemicals remain for leaching to ground water or leaving the field in surface runoff.

Missouri farmers are experimenting with computer-generated soil sampling grids to determine precise fertilizer mixtures. In the field, a computer aboard a fertilizer truck will help ensure the desired mixture is distributed properly.

SCS photo.

'Prescription farming' is so popular with the local Missouri farmers that they have more than 30 000 additional acres ready for application as soon as the experiment is completed Sixty more experimental truck-mounted systems are operating on more than 500,000 acres across the country

U S farm policy also plays a major role in determining what type of agricultural practices producers use in their business These production practices can have significant impact on water quality

Congress recognized this policy-practice interrelation and forged a new era in American agricultural policy in the 1985 and 1990 Farm Bills For the first time in the history of U S farm policy, farmers had to meet environmental standards in order to qualify for farm program benefits

Under the Conservation Reserve Program (CRP), highly erodible land is being planted to grasses and trees, reducing chemical use and the potential for chemical leaching and sedimentation from soil erosion

Since the first signup in 1986, farmers have enrolled approximately 35 6 million acres in the program, and the expected water quality benefits are significant A reduction in soil loss of 655 million tons annually resulted in a 210-million-ton annual reduction in sediment loadings to water bodies The CRP also will reduce herbicide and pesticide usage by an estimated 61 million pounds annually, and a 2 4 million tons annual reduction in fertilizer use

A key component of most conservation compliance plans is conservation tillage and crop residue management USDA scientists know that conservation tillage can provide a significant impact on improving water quality in our streams and lakes The concept is simple Keep the water on the land and you reduce the opportunity to move soil and nutrients to the drainage system

Conservation tillage systems can also provide producers with an economic advantage In my own personal experience as a farmer in Indiana, we cut our cost of production by 18 cents per bushel when we switched from a traditional tillage method to a ridge-tillage system We not only improved our soil and water resources with the new tillage system, but improved crop yields as well

When both conservation compliance and the CRP are fully implemented, SCS estimates the cropland erosion rate in the United States will be reduced by 45 to 50 percent, providing significant water quality benefits

The challenge in the future for USDA, the agriculture industry, and policy makers will be to continue to find ways to integrate environmental and agricultural goals in policy and programs that enhance our nation's environmental and economic opportunities

At a CWA hearing held this past summer, the first question asked by a committee member to the agriculture industry witnesses was, "Tell us why agriculture should not be regulated?"

The upcoming reauthorization of the Clean Water Act (CWA) is the next major challenge for policy makers to try to integrate these environmental and economic goals Nonpoint-source contamination from agriculture will be a main issue in this reauthorization process At a CWA hearing held this past summer, the first question asked by a committee member to the agriculture industry witnesses was, "Tell us why agriculture should not be regulated?"

There are two main schools of thought on how to deal with agricultural nonpoint sources of contamination One emphasizes the adoption of regulations on the use of contaminants The other focuses on the voluntary adoption by farmers of production practices that are both environmentally sound and cost-effective for producers.

USDA's 130 years' experience working with farmers and ranchers supports the philosophy that voluntary action through education is more effective than regulation in addressing our environmental issues. Prohibiting the use of certain chemicals and policing and fining polluters is not the best way to deal with water quality concerns, particularly in a diversified industry such as agriculture

Effective water quality management practices are dynamic for every farm and ranch in this country Two farms located within five miles of each other can have dramatically different water quality plans The goals of these plans are the same, but the conditions on each farm demand different solutions

Regulations undermine agriculture's flexibility in determining production options And flexibility is critical to agriculture s economic stability Regulations will increase the cost of agricultural production and put farm operators who cannot absorb the added costs out of business

American producers are committed to taking care of the water quality problems attributed to agriculture A recent study in Big Spring Basin in Iowa reiterates USDA's long standing philosophy that a voluntary cooperative approach between government agencies and farmers can produce effective results On a volunteer basis, through education and demonstrations conducted in cooperation with USDA 200 farmers cut their nitrogen use from 174 pounds per acre in 1981 to 138 pounds per acre in 1989 Corn yields were not adversely affected

American agriculture is the most productive in the world, not because of government intervention but rather because the partnership between the USDA and American agriculture was allowed to flourish USDA provides the research, technology and education and producers apply this knowledge to the land That same system, given the opportunity can solve our environmental needs as well □

My Experience

The more the residue, the less the pollution of surface water.

by William Richards

My perspective on curbing agricultural nonpoint-source pollution is that of a farmer—

- A farmer who lives by the philosophy that every producer and land owner has the duty and the moral obligation to use the best soil- and water-conservation technology available
- A farmer who believes that good environmental decisions and good business decisions are compatible
- A farmer who, for the past 35 years, helped pioneer "conservation tillage," the practice of maximizing the crop residue you leave as a protective mulch on the surface of a field instead of plowing it under

Interest in conservation tillage is growing rapidly around the country As a farmer, I am excited about this because I know the competitive advantage of this technology I am also excited as Chief of the Soil Conservation Service (SCS), the USDA agency that has helped America protect and conserve soil and water since the Dust Bowl crisis of the 1930s.

The agricultural community's concerns about water quality and soil erosion control are our highest priorities at SCS We are helping producers to understand the interrelationships between soil, water, air, plants, and animals and to apply the information that comes from research and extension agencies and from our own surveys of soil characteristics and other resource conditions

Last year, more than 1 2 million farmers, ranchers, and units of government sought SCS help in developing a conservation plan to ensure that their operations are environmentally and economically sound We offered this help through voluntary conservation programs and through one of the most effective public and private partnerships in this country—our partnership with the more than 3,000 locally organized and locally run soil and water conservation districts

A tremendous array of technology is available to help with a range of environmental concerns But conservation tillage, in my opinion should be the technology considered first for soil erosion control and water quality protection In conservation tillage, the residue of husks, stems and leaves covers the soil surface protecting it from wind and the impact of raindrops The more residue you have, the less runoff—and the less chance that surface water will be polluted by sediment and by nutrients or pesticides adhering to soil particles

This basic concept of crop residue management is beautifully simple and you find it used in home gardens But on the large scale of production agriculture, the technology is complex

Intensive management is the key For example, the amount of residue cover needed to reduce soil erosion to acceptable levels depends primarily on the type of soil, the slope of the ground, the kinds of crops grown on a field and their order in the crop "rotation," and the tillage systems a equipment used

Fortunately, conservation tillage is a flexible technology that allows the farmer to balance market decisions with environmental decisions One way of leaving more crop residue on the ground is to include high-residue-producing crops in a crop rotation sequence Corn and grain sorghum generally are high-residue crops Planting a winter cover crop such as rye or wheat or even a winter-hardy grass, is a good option when growing soybeans during the spring and summer

Other ways to leave more residue include tilling only in the spring, reducing the number of passes with equipment; using equipment that minimizes disturbance of the soil, and using equipment that works under the residue, leaving maximum cover evenly distributed over the surface

Intensive management is required for weed control when you minimize or eliminate plowing. Here we benefit from precision chemical control

We have come a long way in conservation tillage technology The machine industry is responding with a lot of attachments and a lot of retrofit

(Richards is Chief of the Soil Conservation Service U S Department of Agriculture)

FINDING SOLUTIONS

Crop residue management aids in protecting soil, producing crops, and improving water quality. This productive no-till farm is in Ohio.

Gene Alexander photo. Soil Conservation Service.

equipment that can convert a planter at reasonably low cost. So farmers have lots of options in making investment decisions concerning crop residue management.

We have a whole new generation of herbicides that allow us to be much more precise and sparing in our applications. The "post-emergence" herbicides are a boon to conservation tillage farmers in that we can apply them after the weeds have sprouted—instead of before planting—so we know how much is needed and where. This is a real breakthrough.

As a corn farmer in Ohio, I had a real problem with a weed called Johnson grass. But just in the last year two, my sons, who have taken over the family farm, have been controlling Johnson grass quite well with the new herbicides. And we are finding that we just do not need the quantities of chemical we used to need. The new chemistry has opened up whole new areas to conservation tillage.

We have a lot of help from technology, and we have dispelled a lot of the myths about herbicide use, environmental sensitivity, productivity, profitability, and flexibility.

Management is the key. For the farmer, there is less room for error—less opportunity to remedy mistakes with a plow—but the other side of the coin is that conservation tillage rewards management. Early on, I learned the competitive advantage that comes from investing primarily in management and brain power instead of labor and horsepower.

Back in the 1950s and 1960s, when we first started experimenting with conservation tillage, we were looking for ways to cut trips across the field in

Continued on page 46

Some Other Options

On the Farm

There are many different soil-conserving agricultural methods that also act to reduce nonpoint-source pollution. Intelligent use of these methods—either a single one or a combination of several—is in the financial best interest of the farmer who wants both to keep his soil rich and fertile for coming generations and to protect water quality.

Conservation Cover: Establishes and maintains a perennial vegetative cover to protect soil and water on land retired from agricultural production. Conservation cover reduces erosion and can help improve water quality and create or enhance wildlife habitat.

Crop Rotation: Growing different crops in recurring succession on the same land. For example, on a steep slope currently planted in corn or soybeans, a farmer might choose alternately to grow small grains and hay in later plantings and then rotate back to corn or soybeans.

Contour Farming: The practice of preparing land, planting crops, and cultivating them on the contour. Each crop row, by serving as a small dam to hold water on a slope, cuts soil losses. Some contour systems use buffer strips—wide rows of grass between tilled contour rows; others use contour plantings of trees.

Contour Stripcropping: Growing crops in a systematic arrangement of strips and bands on the contour to reduce water erosion. The crops are arranged so that a strip of grass or a

close-growing crop is alternated with a strip of clean-tilled crop or fallow.

Terraces: An earthen embankment, channel, or combination ridge and channel constructed across the slope breaks long slopes into a series of shorter ones. On shorter slopes, water doesn't build up as much speed and has less power to tear away soil particles. Terraces catch water at intervals down the slope to temporarily store it before delivering it through underground tile or a grassed waterway to the bottom of the slope.

Diversion: A channel constructed across a field slope with a supporting ridge on the lower side diverts excess water from one area for use or safe disposal in other areas.

Grade Stabilization Structure: A structure used to stabilize the grade and control erosion in natural or artificial channels so as to prevent formation of gullies.

Filter Strips: Bands of vegetation along streams or other bodies of water filter sediment and other pollutants from runoff before it enters the water body. Grass and, in some cases, trees may well be the last line of defense against erosion and nonpoint pollution.

"Windbreaks": Rows of trees and more random tree and shrub plantings all help to trap sediment from farm fields.

Grassed Waterway: A natural or constructed channel that is graded or shaped to required dimensions and established in suitable vegetation for the stable conveyance of runoff. If waterways are shaped into a parabolic form and seeded to provide a grass cover, the grass will lay down like a carpet as water flows over it. The soil is undisturbed, and cleaner water is delivered to streams, lakes, and reservoirs.

Field Border: A strip of perennial grass, legumes, or a mix of the two established at the edge of a field, like the frame around a picture. It retards soil erosion from the field and both slows and filters polluted runoff.

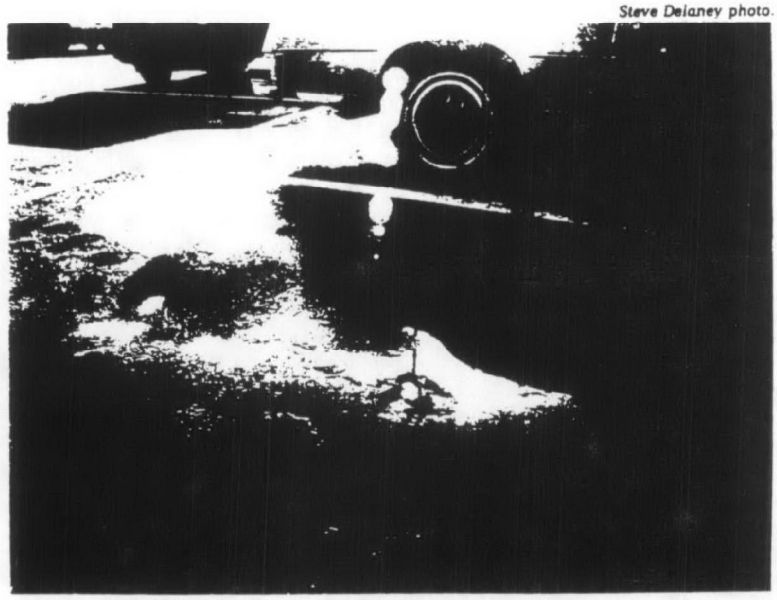
In the City

Controlling nonpoint pollution in urban areas is challenging. Here are several things that you can encourage your community to do:

- Protect open space adjacent to shorelines: The natural vegetation serves as a filter to reduce pollution entering surface waters.
- Establish used oil and household hazardous waste collection programs.
- Identify areas which are eroding or prone to erosion and plant vegetation to stabilize the soil.
- Use and promote walkways and parking lots designed with pervious (not impervious) surfaces.
- Collect leaves and yard trimmings frequently enough to prevent them from washing into stormdrains.
- Increase the frequency of street sweeping in areas where high levels of pollutants accumulate.
- Purchase vacuum street sweepers when obtaining new equipment.
- Establish a tree protection program.

—Jack Lewis

Steve Delaney photo.



Runoff from city streets and parking lots carries oil and other pollutants into storm sewers.

der to save fuel and labor But we quickly realized the importance of surface mulch for moisture retention and consistent yields and for erosion and water quality protection.

My Corn Belt experience with conservation tillage may differ from farmers' experience elsewhere We have different crops soils, and climate However, the basic principles work almost everywhere, including in cotton country

Early on, I learned the competitive advantage that comes from investing in management and brain power . . . .

It is important to understand that conservation tillage is not just a change in field practices It is a change in farming tradition and culture Farmers like to plow, it is part of our heritage But now, we are making the more profitable, more environmentally enhancing practice of conservation tillage part of our culture and part of the heritage we pass on to the next generation I am proud that American farmers are turning to this technology in increasing numbers It represents a big decision for that 2 percent of our population who make their living growing food for the other 98 percent and much of the rest of the world, all the while coping with nature, the market, and public sentiment.

Spreading this technology is one of my highest priorities You might say it is one of the highest priorities for American agriculture because of the challenge to get conservation tillage in the hands of producers subject to conservation compliance requirements of the 1985 and 1990 farm laws These laws tie commodity crop payments and other USDA program benefits to erosion control requirements on highly erodible land

Conservation compliance is an enormous task that involves roughly half the farms in this country It is a task that will double conservation tillage over the next two and one-half years. Right now, we have 73 million acres of conservation tillage We expect to reach 150 million acres by 1995, the statutory deadline for implementing conservation compliance plans Those are the estimates if you look only at crop residue management defined as "conservation tillage " By that I mean crop residue management practices that leave at least 30 percent residue cover on the surface Many plans call for other specified levels of residue cover

Cooperation between private industry, the university and extension community, and government in providing this on-farm technology is unprecedented. The equipment and chemical industries are beginning to see great need and great opportunity for the technology To come, are machines that will help us minimize compaction of soil between crop rows, even more precise spraying technology, and smarter computer-driven technology overall We are looking forward to more conservation tillage attachments for our farm machinery and flexibility so farmers can convert present equipment. Ultimately, I want to see a completely engineered "system" for crop residue management

The systems approach to residue management and to all of our conservation activities is essential for total resource management By "total resource management," I simply mean finding the optimum system of practices that is good for the soil, water, air, plants, and animals and for the producer's profit margin. It means doing our best to fit together all the pieces of the economic and environmental "puzzle."

Let me assure you that the risk of agricultural nonpoint-source pollution can be—and is being—significantly reduced by more prudent application of nutrients and pesticides and by good overall land and water management

We have found in the agricultural community that most soil erosion problems and other environmental problems are very manageable Even if the solution is not conservation tillage other practices such as farming on the contour, using cover crops or stripcropping—perhaps along with conservation tillage—are solutions at our fingertips

I believe, however that conservation tillage will be a key technology for environmentally and economically sound farm management, whatever the issue at hand And I will do everything I can to help industry, government and the farm community get this technology on the ground

April 14, 1992

MEMORANDUM OF AGREEMENT
BETWEEN
THE UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
AND
THE UNITED STATES DEPARTMENT OF AGRICULTURE
on agricultural pollution prevention

The U. S. Environmental Protection Agency (EPA) and the U. S. Department of Agriculture (USDA) agree to the following four basic strategies for implementing pollution prevention in the agricultural sector.

Strategy #1:

EPA and USDA will work together with other federal, state, and local institutions and the private sector to develop and implement a nationwide program to minimize agriculturally-related pollution and reduce environmental risks.

Strategy #2:

EPA and USDA will implement a comprehensive pollution prevention marketing strategy that will seek to achieve voluntary participation by addressing the needs and attitudes of producers and other interested parties within the agricultural community.

Strategy #3:

EPA and USDA will work together to implement a coordinated research, technology development, and technology transfer systems that support agricultural practices that protect and enhance the environment.

Strategy #4:

EPA and USDA will strengthen the working relationship between the two agencies to provide a unified force for positive change in the area of agricultural pollution prevention through voluntary initiatives, incentive programs, and existing regulations.

The undersigned agree to form an interagency Task Force, jointly chaired by USDA and EPA, to develop and implement an overall agricultural pollution prevention plan. This plan will have a detailed statement of strategic objectives incorporating environmental goals; programmatic approaches; institutional roles; financial, human and technological resources; geographic targets; and a specific schedule for achieving objectives in a timely manner.

The Task Force will consult with a broad spectrum of interested parties in preparing the plan. The Task Force will present a draft Implementation Plan to USDA and EPA senior management by October 1, 1992.

James R. Moseley
Assistant Secretary of
Natural Resources and the
Environment

Linda J. Fisher
Assistant Administrator for
Prevention, Pesticides, and
Toxic Substances

United States
Environmental Protection
Agency

Communications Education
And Public Affairs
(A-107)

EPA

Note to Correspondents

TUESDAY, APRIL 14, 1992

The U.S. Environmental Protection Agency today announced that a Memorandum of Agreement (MOA) was signed with the U.S. Department of Agriculture to implement increased pollution prevention in the agricultural sector. The MOA puts into place a plan to address agriculturally related environmental problems.

The agreement, signed by Linda Fisher, EPA's Assistant Administrator for the Office of Prevention, Pesticides, and Toxic Substances; and James R. Moseley, USDA's Assistant Secretary of Natural Resources and the Environment, calls for EPA and USDA to work cooperatively to minimize agricultural pollution and reduce environmental risk to protect and enhance the environment.

The agreement outlines four basic strategies to achieve environmental results: implementation of a nationwide pollution prevention program; establishment of a coordinated research and technology development and transfer system; implementation of a comprehensive marketing strategy to promote voluntary pollution prevention; and a strengthened working relationship between EPA and USDA, using existing incentive programs, voluntary initiatives, and regulatory programs.

The MOA calls for a senior-level interagency task force to develop, by October 1, 1992, a detailed agricultural pollution prevention strategy. The following five areas, with appropriate measurable environmental goals, have been targeted for emphasis:

- Nutrient Management -- developing recommendations for the establishment of a voluntary nutrient management program.

- Total Resource Management Planning -- establishing guidelines for site-specific farm and ranch plans designed to address environmental concerns while maintaining efficient agricultural production.

(more)

Agriculture Pollution Prevention Strategy

April 9, 1992

Draft

U.S. Environmental Protection Agency
U.S. Department of Agriculture
Washington, D.C.

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EXECUTIVE SUMMARY

This strategy represents a new cooperative initiative of the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Agriculture (USDA), to adapt and apply a pollution prevention approach to American agriculture. Bringing agriculture into greater harmony with the environment offers the opportunity for multiple gains on all sides – for the agriculture industry, for consumers, and for communities as a whole.

The goal of the joint USDA/EPA agricultural pollution prevention strategy is to protect human health and aquatic and terrestrial ecosystems while assuring the economic viability of food and fiber production. Agricultural systems should provide for adequate food, fiber, and forest production; safe, diverse, and affordable food supplies; safe water and adequate stream flows; safe work environments; and healthy aquatic and terrestrial systems, in the context of an economically viable and globally competitive production system.

Four strategies are outlined in the document, emphasizing the efficient reduction of risk through voluntary action and public/private partnerships.

Strategy #1:

EPA and USDA will work together with other government institutions and the private sector to implement a nationwide program to minimize agriculturally-related pollution and environmental risks.

A. Achieve nationwide voluntary improvements in nutrient application, pesticide use, animal waste management, and cropland management that will reduce the negative impacts of agricultural activities on the environment.

- Launch a highly visible Voluntary Action Project to secure agreements with agriculture leaders to meet specific environmental goals.

- Achieve specific national goals for adoption of total resource management plans and practices.

B. Reduce use of more hazardous pesticides to protect water, foodstuffs, soil, human health, and ecosystems.

- Expedite registration of low risk pesticides and those that pose lower risks than currently-registered pesticides.

- Provide better information (e.g., hazards, exposures, lowest effective use rate/frequency) to farmers/affected public and promote industry/government partnerships to develop information programs.

- Identify and institute incentives for wider consumer choice regarding pesticides and food (pesticide laboratory accreditation, organic certification).

- Encourage development and use of alternative pest controls (biological, cultural practices, low-risk pesticides).

C. Promote ecologically and economically sound livestock and poultry waste management to protect surface and ground water.

- Establish livestock and poultry compacts for watershed areas.

- Ensure nutrient management plan implementation in priority watersheds.

- Take specific enforcement actions where voluntary means fail to meet near-term environmental objectives.

D. Promote protection and enhancement of ecologically sensitive agricultural areas and stream systems through joint research and conservation programs and by working cooperatively with resource agencies and private landowners.

- Target the most critical ecological resources and endangered species through coordinated multi-media action by federal, state, and private organizations and individuals.

- Promote protection and enhancement of conservation corridors, wetlands, and riparian areas in priority watersheds.

- Pursue geographic priorities for water quality action.

Strategy #2:

EPA and USDA will work together to develop a comprehensive pollution prevention marketing strategy that will seek to achieve voluntary participation by addressing the needs and attitudes of producers and other interested parties within the agricultural community.

A. Identify clienteles and clientele needs.

- Collect social and economic data for target areas and/or resources.

- Conduct marketing studies for identified clienteles.

- Develop targeted marketing strategies.

B. Develop programs to meet clientele needs.

C. Develop the marketing program.

D. Work with farm and ranch organizations to implement marketing program.

Strategy #3:

EPA and USDA will work together to develop a coordinated research, technology development, and technology transfer system that supports production practices that protect and enhance the environment.

A. Sponsor research to develop new and innovative tools.

- Increase support for research on: systems that minimize the adverse movement of agricultural chemicals; sustainable agriculture; farm systems; etc.

- Increase support for research on the health and ecological effects of agricultural activities.

- Speed development of reduced risk substitutes for today's most risky pesticides.

- Develop improved technologies for the environmentally protective application of pesticides and nutrients.

- Conduct studies and provide information on barriers to reducing unnecessary pesticide use.

B. Transfer research findings.

- Develop improved methods for transfer of technology to achieve behavioral and environmental improvements.

- Investigate the effectiveness of alternative methods to market new and environmentally-sound agricultural practices.

Strategy #4:

EPA and USDA will strengthen the working relationship between the two agencies in order to provide a unified force for positive change in the area of agricultural pollution prevention.

A. Develop and finalize a USDA/EPA memorandum of agreement on agricultural pollution prevention activities.

B. Identify and implement joint legislative authorities related to agricultural pollution prevention in the Clean Water Act, the 1985 and 1990 Farm Bills and future legislation.

C. Identify opportunities for additional sources of funding that can be targeted to agricultural pollution prevention.

D. Establish an EPA/USDA Task Force to develop and carry out the implementation phase of the agriculture pollution prevention strategy.

Focusing on agriculture and pollution prevention offers policy makers the chance to address a number of difficult environmental problems. Specific action plans will be developed over the next few months to identify the offices within EPA and USDA that will carry out the activities outlined in the strategy document.

AGRICULTURE
POLLUTION PREVENTION STRATEGY

I. INTRODUCTION

This strategy represents a new cooperative initiative of the U.S. Environmental Protection Agency (EPA) and the U.S. Department of Agriculture (USDA) to adapt and apply a pollution prevention approach to American agriculture. The challenge is to continue to produce a safe and abundant food supply while assuring the economic viability of the agricultural sector, protecting public health, and preserving the integrity of the environment. The goal is to keep America's agricultural sector on a healthy footing -- environmentally sound and financially viable.

Among the many activities that affect the environment, agriculture is one of the most prominent, so prominent, indeed, that only rarely is agriculture addressed as a single entity. Numerous environmental issues -- ground-water contamination, water quality and availability, occupational and dietary exposures to pesticides, nonpoint source pollution and soil productivity -- have strong associations with agriculture. Focusing on agriculture and pollution prevention offers policy makers an opportunity to address a number of difficult problems simultaneously. The connections between agriculture and the environment are examined in more detail in section II of this strategy document.

The challenges involved in bringing agriculture into greater harmony with the environment are many and will require a variety of approaches during the next decade and well into the twenty-first century. No single approach to agriculture can possibly be appropriate for all two million American farms, much less to forestry and other types of agricultural establishments. What *is* clear at this point is the direction of change, and the goals towards which we need to move. Section III of this document outlines

a set of pollution prevention strategies for addressing the environmental issues associated with agriculture.

Many of these goals and targets will be determined and implemented through discussions between the public and private sectors. There remains a great deal of room for flexibility and individual initiative, new approaches and local innovations. This strategy document is therefore envisioned as a first step -- but significant step -- towards a national strategy on agriculture and the environment.

A. Goals and Approach

The goal of the joint USDA/EPA agricultural pollution prevention strategy is to protect human health and aquatic and terrestrial ecosystems while assuring the economic viability of food and fiber production.

Agricultural systems should provide for adequate food, fiber, and forest production; safe, diverse, and affordable food supplies; safe water and adequate stream flows; safe work environments; and healthy aquatic and terrestrial systems, in the context of an economically viable and globally competitive production system.

The strategy is based on the following approach:

- Priorities are set and pollution prevention activities are targeted based on knowledge of *risk to human health and natural ecosystems.*

- Available tools are employed to efficiently reduce risk through *voluntary action.* Tools include market incentives, public/private partnerships, information and labeling, and other educational tools that empower people. Examples of these tools in the agricultural setting are provided in Exhibit 1. Regulations and enforcement are used as needed.

Exhibit 1
Selected Examples of Available Tools

Tools	Examples
Information and Education	Improved soil tests Improved biological controls Improved practices to support long-term soil productivity Recommendations for safer pesticide use and more efficient fertilizer use Improved efficiencies of equipment use Improved irrigation and application technology Improved pesticide hazard and exposure information Assistance in setting priorities Recommendations for modification of crop varieties, crop rotation, fallowing, and intercropping
Market Mechanisms & Economic Incentives	Product substitution Performance awards Altered price support structures Cost sharing Organic certification
Technical Assistance	Total resource management plans Nutrient and pesticide management plans
Voluntary Action	Improved chemical use, reduced land use intensity, appropriate grazing rates Obtaining consensus on local environmental needs
Regulations and Enforcement	Animal permits Public drinking water requirements Pesticide use restrictions

- *Partnerships* are encouraged as a particularly important framework for undertaking initiatives. Partnerships can encompass interested parties at all levels of involvement, in both the private and public sectors.

- *New approaches* to reduce risk need to be stimulated and implemented, including less risky substitutes and more environmentally and economically efficient use of chemicals.

- Progress is evaluated by quantitative and qualitative measures of *environmental and economic results.*

This strategy is the result of a year-long effort by a joint EPA/USDA Focus Group. In developing the strategy, much thought was given to building on prevention efforts already underway at both EPA and USDA, rather than duplicating current efforts. The strategy focuses on opportunities that are not currently receiving attention and that appear to be most promising.

The selection of candidates for new prevention initiatives also emphasizes addressing multiple risks. For example, total resource management planning usually involves an examination of multiple sources of risk to human health and ecological systems; similarly, protection of riparian systems, which filter several pollutants, de-nitrify nitrogen, and provide critical aquatic and terrestrial habitat, offers multiple environmental benefits.

B. Legislative and Policy Background

Over the past few years, pollution prevention has become an increasingly high priority in the public policy agenda. This new emphasis has been spurred by the complex environmental challenges facing us in the 1990s, the limitations of traditional pollution control approaches, and our growing understanding of the complexity of ecological systems.

In an influential report issued in September 1990, EPA's Science Advisory Board (SAB) stated as a major recommendation that "EPA should

emphasize pollution prevention as the preferred option for reducing risk."[1] Of the eight highest-risk environmental problems identified by the SAB in that report, four have some association with agriculture (worker exposure to chemicals in agriculture, drinking water pollution, loss of habitats, and species extinction/loss of biodiversity).

At USDA, interest in a preventive approach to agricultural pollution has evolved out of the President's Initiative for Water Quality and in response to State NPS Assessment reports prepared pursuant to Section 319 of the Clean Water Act that identify agriculture as a principal source of nonpoint source pollution.

In 1990, Congress affirmed its commitment to a new approach to environmental pollution by passing the Pollution Prevention Act of 1990. The Act establishes as "national policy" a hierarchy of environmental protection which states that:

- Pollution should be prevented or reduced at the source wherever feasible;
- Pollution that cannot be prevented should be recycled in an environmentally safe manner;
- Pollution that cannot be prevented or recycled should be treated in an environmentally safe manner; and
- Disposal or other release into the environment should be used "only as a last resort."

[1] U.S. EPA, *Reducing Risk: Setting Priorities and Strategies for Environmental Protection*, Washington, D.C., September, 1990.

EPA's National Pollution Prevention Strategy[2] commits the Agency to develop specific strategies for agriculture as well as other sectors of the economy. The publication of this strategy also responds to a request from the Senate Appropriations Committee to address "the full range of environmental problems including agriculture, energy, and Federal activity as well as from industrial point sources."[3]

C. Organizational Involvements

In developing this strategy, EPA and USDA worked closely to define goals, develop objectives, and determine the most feasible approach to achieve success. The working relationship and increasing convergence of the goals of these two federal departments is an important aspect of this strategy. Specific action plans will be developed over the next few months to identify the offices within EPA and USDA that will carry out the activities outlined in the strategy.

Implementation of this strategy may encompass a wide variety of people and organizations involved in the agricultural world, including the following:

- **Individuals** -- farmers, ranchers, farm equipment distributors and dealers, chemical producers, consumers, agricultural marketers, exporters, farm laborers, wildlife recreationists, farm neighbors/ communities.

- **Trade and Interest Groups** -- community, chemical and machine industry, food processors, marketers, environmental and conservation groups, consumers, commercial fishermen.

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[2] U.S. EPA, *Pollution Prevention Strategy*. Washington, D.C., Federal Register 56:7849-64, February 26, 1991.

[3] Report of the Committee of Conference accompanying H.R. 5158.

- **Other Organizations** – local, county, state, agricultural, forestry, university, non-governmental private and quasi-public organizations.

- **Governments** – local, county, and state officials; Native American tribal governments; soil and water conservation districts. At the federal level, EPA, USDA, the Occupational Safety and Health Administration (OSHA), the Food and Drug Administration (FDA), the U.S. Geological Survey (USGS), the Department of Energy, the National Oceanic and Atmospheric Administration (NOAA), the Army Corps of Engineers, and several agencies within the Department of the Interior such as the Bureau of Land Management, the Bureau of Reclamation, and the Fish and Wildlife Service.

II. AGRICULTURE AND POLLUTION PREVENTION

A. Agriculture and the Environment

Agricultural impacts on the environment have come under increasing scrutiny in recent years as investments by industry and municipalities have reduced other sources of pollution. Agricultural pollution is often categorized as a type of "nonpoint source pollution" because it cannot be traced to a single source such as an industrial discharge pipe. Nevertheless, a variety of environmental effects on human health and the environment can result from agricultural activity:

- **Water Quality and Quantity** – surface water and ground water may be contaminated by pesticides, fertilizers, sediment, and animal waste; water quantity and quality may be affected by irrigation which can reduce instream flows and deplete aquifers.

- **Global Climate Change** – clearing of land releases stored carbon as carbon dioxide, livestock contribute methane; these greenhouse gases are implicated in global warming.

- **Soil** – soil erosion reduces soil productive capacity and leads to sedimentation in streams, lakes, and estuaries; irrigation can affect soil salinity and the health of wetlands that receive irrigation return flows.

- **Human Health** – exposure to agricultural chemicals can occur through occupational contact with chemicals by agricultural workers, residues of pesticides in foods, pesticide drift, and pesticides and nitrates in drinking water.

- **Biodiversity and Habitat** – pesticides may kill non-target birds and other non-target organisms such as beneficial insects; sediment can cover aquatic organisms and spawning areas; conversions to

cropland and grazing operations may cause losses in terrestrial and aquatic habitats such as wetlands and riparian areas, and may directly or indirectly lead to reductions in species diversity and abundance.

A variety of approaches have been put forward in recent years to bring agriculture into greater harmony with the environment. Although there is no single blueprint, a hallmark of these approaches is that they typically treat the farm as a single, balanced system. The goal in a balanced farming system is *total resource management* – specifically, to minimize the need for hazardous pesticides and excess nutrients, conserve water and soil, enhance soil productivity, and ensure that farms can continue to produce adequate food supplies while providing farmers with a reasonable profit. Depending on site specific factors of location, crop, climate, etc., some or all of the following practices will be appropriate:

- Improved nutrient recommendations and timing of application of nutrients.

- Crop rotations, which mitigate weed, disease, and insect problems, increase available soil nitrogen, improve soil structure, and reduce soil erosion.

- Integrated pest management (IPM), which generally reduces the need for environmentally hazardous pesticides by relying more on crop rotations, scouting, weather monitoring, use of resistant cultivars, timing of planting, and biological pest controls.

- Soil-conserving tillage that retains a protective cover of crop residues.

- Animal production systems that properly manage waste products to prevent pollution of surface and ground waters.

B. Structure of Agriculture

Any strategy for the prevention of agricultural nonpoint source pollution must consider the significant changes in the structure of agriculture in the last 25 years as well as historical factors that have influenced agricultural policy.

In the last quarter century, the United States has seen a shift away from the middle-sized family farm that had characterized American agriculture since colonial days. Most agricultural production in the U.S. is now centered on a small number of very large farms. At the other end of the spectrum, there has been a proliferation of small farms where the owner must work off the farm in order to survive, or where the owner is a wealthy landowner who wants to "hobby" farm.

Other changes have occurred in the structure of American agriculture as well. There has been a sizable increase in the amount of U.S. farmland owned by people who do not farm. Many farms are owned by absentee owners, who lease land to larger farmers or farm management firms to operate the farms. Rural communities are no longer dominated by agriculture, and farmers make up only about 15 percent of the rural population.

These changes have contributed to a fragmentation of the agricultural sector into a number of smaller differentiated groups with different needs, motivations, and perspectives on agriculture. The success of a largely-voluntary pollution prevention program will depend on the receptivity of individual farmers and ranchers, their willingness to invest time and resources in changing their practices, and the ability of the implementing organizations to design programs that meet client needs. Switching to less familiar agricultural methods will involve uncertainty and change; the new techniques may require more labor, time, or information than conventional farming with one or two crops. It will be imperative to understand the needs and perspectives of different agricultural communities and "audiences" in order to effectively promote change.

C. Opportunities for Change

Some farmers have recently been adopting the technologies of conservation tillage, integrated pest management, and nutrient management, as well as the concepts of total resource management. Many programs and technologies are currently being demonstrated in the field; communities are working with agricultural producers and agribusiness; states and research organizations are active as well.

Key opportunities for change stem from recent Presidential mandates and Congressional legislation in the areas of conservation and water quality. By far the largest resources for protecting the environment have become available as a result of the Farm Bills of 1985 and 1990. Nearly a tenth of U.S. cropland will be idled for several years by the Conservation Reserve Program (for highly erodible land) and the Wetlands Reserve Program set up by the legislation. Erodible lands and wetlands are further protected by compliance programs which deny virtually all farm program benefits to farmers who fail to adhere to plans on their highly erodible lands or who plow up wetlands without mitigating the loss.

As they are fully implemented over the next few years, the effects of the 1990 Farm Bill and its agricultural conservation provisions will be considered in further developing this agricultural pollution prevention strategy.

At both EPA and USDA a number of programs are currently underway that relate to agricultural pollution prevention. Several of them are described briefly below.

- **Integrated Pest Management Forum.** EPA and USDA are cosponsoring a public/private National IPM Forum in June 1992. The goal of the forum is to accelerate the development and implementation of environmentally-sound pest management practices and to identify the best methods for overcoming current impediments to the broad-scale adoption of IPM in American agriculture. Four commodity teams (for vegetables, fruits, cotton,

and corn/soybeans) have been tasked to prepare blueprints for action.

- **Nonpoint Source/Coastal Nonpoint Programs.** Under section 319 of the Clean Water Act, EPA awarded $51 million in grant funds to the States in 1991 and is awarding $52 million in 1992 to implement EPA-approved state management programs for nonpoint source pollution control; agricultural projects receive the most funds of all types of nonpoint sources. Many of the projects emphasize pollution prevention or source reduction. Examples include integrated pest management, nutrient management, proper disposal of dead poultry, sediment control, etc. Under the authority of the amended Coastal Zone Management Act, EPA is developing guidance specifying management measures for sources of nonpoint pollution (including agriculture) in coastal waters. Measures have been proposed for sediment control, animal waste management, nutrient and pesticide management, grazing, and irrigation.

- **Conservation Reserve Program.** The 1990 Farm Bill set a goal of enrolling 39 to 44 million acres in the Conservation Reserve Program (CRP) which takes fragile farmland out of production for between 10 and 15 years. Producers who enroll in the CRP receive an annual rental payment for idling the land; they also receive cost-share help for establishing permanent cover (either grass or trees). Over 35 million acres have been enrolled in the USDA-administered program since 1985; the average soil loss on these acres has been reduced from nearly 22 tons per acre per year to less than 2 tons per acre per year. Stream corridors, wellhead protection areas, and other environmentally critical lands are also eligible for CRP.

- **Registration of Reduced Risk Pesticides.** An April 1992 Federal Register notice and public workshop solicits public comments on possible policies, criteria, and procedures for encouraging the development and registration of negligible-risk pesticides and replacement pesticides that are less hazardous than currently-registered products. Options may include faster review of

applications, lower fees and registration costs, reconsideration of current registrations for riskier pesticides, and public listing of risky pesticides as targets for replacement.

- **Sustainable Agriculture.** The Sustainable Agriculture and Research Program (formerly known as LISA) started in FY 1988 as a small but innovative grants program to develop and disseminate to farmers practical, reliable information on alternative farming practices. To date, the Cooperative State Research Service of USDA has cooperated with 1,600 farmers on a wide range of alternative agriculture research and demonstration projects.

- **ACE Grants.** One of the first interagency cooperative grant programs in the federal government, the Agriculture in Concert with the Environment (ACE) grant program is administered by EPA's Office of Pollution Prevention and the USDA Cooperative State Research Service. Twenty-one grants were awarded in FY 1991 with the objective of assuring the adoption of sustainable agriculture practices and reducing the use of herbicides and other pesticides.

- **President's Water Quality Initiative.** Several agencies concerned with environmental quality are implementing the President's initiative on water quality, including USDA, EPA, and USGS. The primary objectives are to determine the relationship between agricultural activities and ground water quality, and to develop and encourage the adoption of technically and economically effective agricultural management and production strategies to protect ground and surface water quality. The three major components of the initiative are education and technical assistance, research and development, and database development.

III. POLLUTION PREVENTION STRATEGIES

This section presents EPA and USDA's strategy for achieving substantial, measurable pollution prevention in the agricultural sector. Four strategies are outlined here, along with more specific objectives and targets.

Strategy #1:

EPA and USDA will work together with other government institutions and the private sector to implement a nationwide program to minimize agriculturally-related pollution and environmental risks.

A. Achieve nationwide voluntary improvements in nutrient application, pesticide use, animal waste management, and cropland management that will reduce the negative impacts of agricultural activities on the environment.

- Launch a highly visible Voluntary Action Project to secure agreements with agriculture leaders to meet specific environmental goals.

  - Implement in phases: cropland, animals, forestry, grazing.

  - Focus on a small number of catalytic forces with significant public impact.

  - Example approaches: marketing campaign to farmers about crop residue management and reduced tillage; focused campaign with largest nitrogen suppliers; targeting of major buyers.

- Achieve specific national goals for adoption of farm management plans and practices.

- Develop and implement total resource management plans for farmers and ranchers. Institute incentives for adoption of these plans.

- Assist in educating and/or certifying farm, range, and forestry consultants.

- Improve nitrogen fertilizer and pesticide recommendations, management criteria, and farm guidance on implementation.

B. Reduce use of more hazardous pesticides to protect water, foodstuffs, soil, human health, and ecosystems.

- Expedite registration of low risk pesticides and those that pose lower risks than currently-registered pesticides.

- Provide better information (e.g., hazards, exposures, lowest effective use rate/frequency) to farmers/affected public and promote industry/government partnerships to develop information programs.

- Identify and institute incentives for wider consumer choice regarding pesticides and food (pesticide laboratory accreditation, organic certification).

- Encourage use of alternative pest controls (biological, cultural practices, low-risk pesticides).

C. Promote ecologically and economically sound livestock and poultry waste management to protect surface and ground water.

- Establish livestock and poultry compacts for watershed areas.

- Ensure nutrient management plan implementation in priority watersheds.

- Take specific enforcement actions where voluntary means fail to meet near-term environmental objectives.

D. Promote protection and enhancement of ecologically sensitive agricultural areas and stream systems through cooperative efforts with resource agencies and private landowners and through research and protection programs.

- Target the most critical ecological resources and endangered species through coordinated multi-media action by federal, state, and private organizations.

- Promote protection and enhancement of conservation corridors, wetlands, and riparian areas in priority watersheds.

- Pursue geographic priorities for water quality action.

  - Identify priority watersheds/recharge areas for surface and ground water protection, based on environmental risk.

  - Assist local leadership in setting criteria and establishing agreements to improve the environment.

  - Rely on education and technical assistance, where it proves effective.

  - Monitor water quality improvement against agreed-upon targets.

  - Promote public/private partnerships to protect instream flows.

Strategy #2:

EPA and USDA will work together to develop a comprehensive pollution prevention marketing strategy that will seek to achieve voluntary participation by addressing the needs and attitudes of producers and other interested parties within the agricultural community.

A. Identify clienteles and clientele needs.

- Collect social and economic data for target areas and/or resources.
- Conduct marketing studies for identified clienteles.
- Develop targeted marketing strategies.

B. Develop programs to meet clientele needs.

C. Develop the marketing program.

D. Work with farm and ranch organizations to implement marketing program.

Strategy #3:

EPA and USDA will work together to develop a coordinated research, technology development, and technology transfer system that supports production practices that protect and enhance the environment.

A. Sponsor research to develop new and innovative tools.

- Increase support for research on systems which reduce the use and movement of agricultural chemicals; sustainable agriculture; farm system research; etc.
- Increase support for research on the health and ecological effects of agricultural activities.

- Speed development of reduced risk substitutes for today's most risky pesticides.

- Develop improved technologies for the environmentally protective application of pesticides and nutrients.

- Conduct studies and provide information on barriers to reducing unnecessary pesticide use.

B. Transfer research findings.

- Develop improved methods for transfer of technology to achieve behavioral and environmental improvements.

- Investigate the effectiveness of alternative methods to market new and environmentally-sound agricultural practices.

Strategy #4:

EPA and USDA will strengthen the working relationship between the two agencies in order to provide a unified force for positive change in the area of agricultural pollution prevention.

A. Develop and finalize a USDA/EPA memorandum of agreement on agricultural pollution prevention activities.

B. Identify and implement joint legislative authorities related to pollution prevention in the Clean Water Act, the 1985 and 1990 Farm Bills and future legislation.

C. Identify opportunities for additional sources of funding that can be targeted to pollution prevention.

D. Establish an EPA/USDA Task Force to develop and carry out the implementation phase of the pollution prevention strategy.

IV. MEASURING PROGRESS

For each of the four agricultural pollution prevention strategies, quantifiable measures will be developed and monitored, with an emphasis, wherever possible, on assessing progress in terms of environmental and economic results. Examples of measures of progress may include the following:

- Increases in numbers of certified farm consultants
- Number of states adopting improved fertilizer recommendations
- Acreage of cropland under total resource management planning
- Acreage of cropland under integrated pest management and following nutrient recommendations for nitrogen and phosphorus
- Availability and use of lower risk pesticides
- Acreage of riparian lands enrolled in the CRP
- Acreage of restored wetlands, riparian stream corridors on public grazing lands, and other environmentally sensitive areas
- Development of goals for changes in use and application of agricultural chemicals
- National certification program for organic foods.

V. CONCLUSION

For generations, American agriculture has been the pride of this country and a source of our prosperity. Bringing agriculture into greater harmony with the environment offers the opportunity for multiple gains on all sides -- for the agriculture industry, for consumers, and for communities as a whole. At the same time, a vigorous pollution prevention effort in the agricultural sector will complement pollution prevention efforts going on in other sectors -- industry, energy and transportation, the federal government, and the consumer sector.

STORM WATER - FACT SHEET

Water Quality Impacts/ Environmental Risks:

- Pollution from runoff of agriculture, urban areas, and other sources is a leading cause of water quality impairment States reported that nonpoint sources including urban runoff, resource extraction, and construction activities caused up to 30% impairment of the use impairment in waters that were assessed. ["The National Water Quality Inventory", 1988 Report to Congress]
  38 states have reported urban runoff as a major cause of use impairment; 21 states report construction site runoff as a major cause of use impairment; storm water has contributed to the impairment of approximately one quarter of the lakes and estuaries assessed by states and found to be impaired. [1985 ASIWPCA study; "America's Clean Water- The States Nonpoint Source Assessment"]
- Shellfish harvesting is limited in numerous areas of the Gulf, East, and West coasts due to urban runoff. Gulf Coast- 1,000,000 acres, West Coast- 130,000 acres, East coast- 600,000 acres. [*The Quality of Shellfish Growing Waters on the East Coast, West Coast, and Gulf of Mexico*, NOAA 1988-90]

Statutory Provisions: - The Clean Water Act, amended in 1987 to include section 402(p)

- Establishes 2-Phase Storm Water Program
  - Phase I- Permits required for large (over 250,000 pop. served) and medium (100,000 - 250,000 pop. served) separate storm sewer systems and storm water discharges "associated with industrial activity".
  - Phase II- EPA to assess remaining storm water discharges, establish procedures and methods to control storm water contamination to extent necessary to mitigate impacts on water quality, and issue Phase II storm water regulations by October 1, 1992.

Regulatory Provisions:

- Current Regulations
  - Final rule published 11/16/90 established scope of program. defined "storm water discharge associated with industrial activity", identified 220 large and medium municipal storm sewer systems, and established permit application requirements
  - Current Municipal Application Deadlines:
    - Medium municipal separate storm sewer system. Part 1- 5/18/92; Part 2- 5/17/93
    - Large municipal separate storm sewer system. Part 1- 11/18/91; Part 2- 11/16/92
  - Current Industrial Application Options and Deadlines.
    - Individual application- The deadline for submission of an individual application is 10/1/92
    - Two Part Group Application- Part 1 - 9/30/91; Part 2 - 5/18/92 (Proposed extension to 10/1/92)
      Facilities may add to existing groups until 2/18/92. (For industrial activities conducted by municipalities, see Transportation Act below)
    - General permits- Facilities may file a Notice of Intent (NOI) to be covered by a general permit once one is adopted

  Coverage·
    - Municipal: 173 cities and 47 counties
    - Industrial: Over 100,000 facilities that have storm water discharges associated with industrial activity. These include: manufacturing/industrial facilities; construction operations involving at least 5 acres; hazardous waste treatment, storage, and disposal facilities; landfills, certain sewage treatment plants; recycling facilities; power plants, mining operations, some oil and gas operations; airports; and other transportation facilities.
    - Discharges to a combined sewer system or public owned treatment works (POTW's) are not required to get a permit

Storm Water Implementation Package for Industrial Dischargers of Storm Water:

- General Permit - relies primarily on pollution prevention approach requiring development of a management plan to prevent contamination of storm water runoff - high risk sources must comply with additional conditions.
- Proposed rule for draft general permit, published on 8/16/91, for use in the 12 states where EPA is the permitting authority AK, AZ, FL, ID, LA, MA, ME, NH, NM, OK, SD, and TX.
- Long-term Strategy - risk-based approach to deal with identified water quality problems and support watershed initiatives The strategy consists of a four tiered framework:
  - Tier I - Baseline Permitting: One or more general permits will be developed to initially cover the majority of storm water discharges associated with industrial activity.
  - Tier II - Watershed Permitting: Facilities within watersheds shown to be adversely impacted by storm water discharges associated with industrial activity will be targeted for individual or watershed-specific permits.
  - Tier III - Industry-Specific Permitting: Specific categories will be targeted for individual or industry-specific general permits
  - Tier IV - Facility-Specific Permitting: A variety of factors will be used to target specific facilities for individual permits

Surface Transportation Act of 1991

- Changes.
  - Industrial activities conducted by municipalities of less than 100,000 population placed into moratorium with three exceptions power plants, airports, and uncontrolled sanitary landfills.
  - Individual permit application deadline of 10/1/92 confirmed for "municipal industrial" applications.
  - Part 2 Group application deadline for industrial activities conducted by municipalities above 250,000 population set for 10/1/92
  - New Deadlines for group applications for industrial activities conducted by municipalities of 100,000 - 250,000 population (and power plants, airports, and uncontrolled sanitary landfill activities conducted by municipalities of less than 100,000 population) Part 1 - 5/18/92, Part 2 - 5/17/93

Application Deadlines for Storm Water Discharges Associated with Industrial Activity

	Final Deadlines Established in 11/16/90, 3/21/91, and 11/5/91 Rulemakings	Deadlines in Highway Transportation Act (Only addresses facilities owned or operated by municipalities) A	B	C	D
Individual Application	10/1/92	10/1/92	10/1/92	10/1/92	post 10/1/92
Individual Application from facility rejected from group application	12 months from notification of rejection or 10/1/92	180 days after rejection from group	180 days after rejection from group	180 days after rejection from group	post 10/1/92
Group Application: Part 1	9/30/91	9/30/91	5/18/92	5/18/92	post 10/1/92
Group Application: Part 2	5/18/92 10/1/92 (proposed)	10/1/92	5/17/93	5/17/93	post 10/1/92
Individual Application from facility with existing NPDES permit	180 days prior to expiration of permit	no change	no change	no change	no change
Individual Application for construction activities disturbing 5 or more acres	90 days before construction commences	no change	no change	no change	post 10/1/92
Individual Application for new storm water discharges (other than construction activities)	180 days before discharge commences	no change	no change	no change	post 10/1/92

KEY: A - Industrial activity conducted by Municipalities with a population of 250,000 or more
B - Industrial activity conducted by Municipalities with a population of 100,000 or more, but less than 250,000
C - Airports, powerplants, or uncontrolled sanitary landfills operated by Municipalities with a population of less than 100,000
D - All other storm water discharges from industrial activities owned or operated by municipalities with a population of less than 100,000

NOTES: Persons covered by general permits are excluded from requirements to submit individual permit applications (see 40 CFR 122.21(a)). Instead, application requirements and deadlines for a general permit, referred to as a notice of intent (NOI), are established in the general permit. Operators of storm water discharges associated with industrial activity which are currently not authorized by an NPDES permit must submit an individual application, comply with Part 2 group application requirements, or obtain coverage under an appropriate general permit by the deadline for individual permit application or Part 2 group application.

THE EPA MUST ISSUE REGULATIONS WITH RESPECT TO GENERAL PERMITS FOR STORM WATER DISCHARGES ASSOCIATED WITH INDUSTRIAL ACTIVITY ON OR BEFORE 2/1/92.

Application Deadlines for Discharges from Municipal Separate Storm Sewer Systems

		11/16/90 NFRM	CWA Deadlines
Municipal Separate Storm Sewer Systems Serving a Population of 250,000 or more	Part 1	11/18/91	2/4/90
	Part 2	11/16/92	-
Municipal Separate Storm Sewer Systems Serving a Population of 100,000 or more, but less than 250,000	Part 1	5/18/92	2/4/92
	Part 2	5/17/93	-

Highway Transportation Act made no mention of these deadlines

STCRM WATER FACT SHEET

December 12, 1991

STORM WATER FACT SHEET

Where did the storm water program come from?	
1972	Federal Water Pollution Control Act requires National Pollutant Discharge Elimination System (NPDES) permits for all point source discharges to water.
1973	EPA issues regulations requiring permits only for storm water contaminated by industrial or commercial activity Point source discharges of "uncontaminated" storm water are exempt unless "significant contributors" of pollution.
1975	Court of Appeals remands 1973 regulations holding that permits are required for all point source discharges of storm water
1987 Amendments to CWA	The Clean Water Act (CWA) is amended to require EPA to establish a phased program to address storm water discharges
Phase I	Prior to October 1, 1992, NPDES permits are prohibited for discharges composed entirely of storm water, except. • Discharges that were issued a permit prior to February 4, 1987 • Discharges associated with industrial activity • Discharges from medium and large municipal separate storm sewer systems (systems serving a population of 100,000 or more) • Discharges designated by EPA or an NPDES State as a significant contributor of pollutants or contributing to the violation of a water quality standard
	Deadlines for EPA to issue permit application regulations, for dischargers to submit applications, and EPA or NPDES States to issues permits are established
	Best Available Treatment (BAT) and water quality-based requirements apply to permits for storm water discharges associated with industrial activity
	Permits for discharges from municipal separate storm sewer systems: (1) may be issued on a system-wide basis; (2) must effectively prohibit non-storm water discharges, and (3) must control pollutants to the Maximum Extent Practicable (MEP), including compliance with water quality standards.
Phase II	EPA must conduct two studies of storm water discharges not covered under Phase I
	Prior to October 1, 1992, EPA must issue regulations which designate additional storm water discharges to be regulated to protect water quality and establish a comprehensive program to regulate such discharges The program shall, at a minimum: A. Establish priorities B. Establish requirements for State storm water management programs C. Establish deadlines The program may include performance standards, guidelines, guidance, and management practices and treatment requirements

What has EPA been doing this past year to implement the storm water program?

Promulgated final Storm Water application regulation: (1) defines a storm water discharge associated with industrial activity; (2) establishes group and industrial NPDES permit application requirements; (3) defines large and medium municipal separate storm sewer system; and (4) establishes two-part permit application requirements for municipal systems (November 16, 1990).

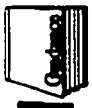
Storm Water Hotline responded to over 25,000 calls since the Application rule was published (12/90 - 11/91).

Participated in over 50 workshops and presentations throughout the country training permitting authorities and educating the regulated community.

Extended regulatory deadline for Part 1 of the group application from March 18, 1991 to September 30, 1991

Extended the individual permit application deadline from November 18, 1991, to October 1, 1992 (Proposed to extend the deadline for Part 2 of the group application from May 18, 1992 to October 1, 1992.)

A total of 1,200 Part 1 group applications received to date covering approximately 58,000 facilities.



Published and distributed municipal and industrial permit application manuals in addition to numerous summaries, fact sheets, and workshop materials.

Model Part 1 group application and supplemental information published and distributed

Proposed Storm Water Implementation Rule including draft baseline general permit (August 16, 1991)

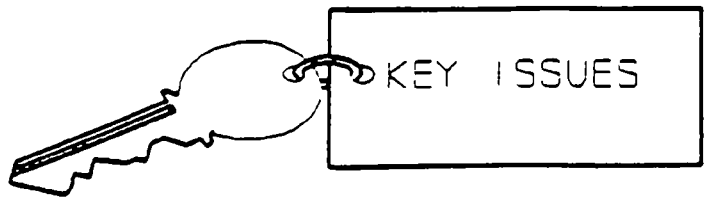
Fourteen public hearings held throughout the country to discuss general permits

Comments on the Implementation Rule totaling over 2,600 pages received from over 300 commentors.

NRDC/EPA oral arguments (9th Circuit) in litigation challenging November 1990 rule on scope, deadlines, and coverage of inactive mines (October, 1991)

Responded to over 120 Congressional letters, and over 200 other correspondences

National Storm Water Coordinators Meeting (November 12-13, 1991).



I Risk-based Approach

Statute required mandatory permit-based approach based on storm water discharges associated with industrial activity. EPA has developed the following risk-based permitting strategy to implement statutory requirements:

Tier I. Minimum baseline general permit for most discharges

Tier II: Watershed permitting - target facilities within adversely impacted watersheds for individual or watershed-specific permits

Tier III: Industry-specific permitting - industrial categories will be targeted for individual or industry-specific general permits

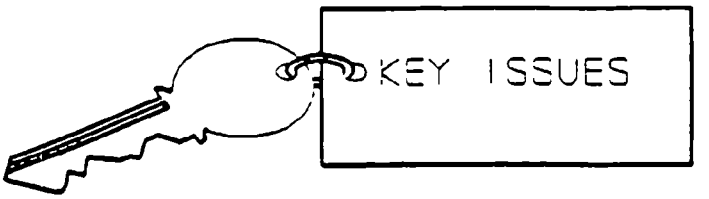
Tier IV Facility-specific permitting - target individual facilities causing particularly severe impacts for individual permits.

II Defining Which Industrial Facilities are Included in the Storm Water Program

EPA has defined the term "storm water discharge associated with industrial activity" in a comprehensive manner to address over 100,000 facilities (see Appendix A for complete definition and Appendix B for a discussion of applicability of the definition). Storm water discharges associated with industrial activity th discharge through municipal separate storm sewer systems must also submit NPDES permit applications, including those which discharge through systems serving populations less than 100,000. Discharges of storm water to a combined sewer system or to a POTW are excluded.

Facilities with storm water discharges associated with industrial activity include: 1) facilities subject to storm water effluent guidelines, new source performance standards, or toxic pollutant effluent standards, 2) manufacturing facilities; 3) mining operations and oil and gas operations; 4) hazardous waste treatment, storage, or disposal facilities; 5) landfills, land application sites and open dumps; 6) recycling facilities, 7) steam electric power generating facilities, 8) certain transportation facilities; 9) certain sewage treatment plants; 10) construction activity disturbing five or more acres; and 11) other manufacturing facilities where materials or activities are <u>exposed</u> to storm water. Operators of industrial facilities that are Federally, State, or municipally owned or operated that meet the description of the facilities listed in 122.26(b)(14)(i)-(xi) must also submit applications

The storm water regulation presents three permit application options for storm water discharges associated with industrial activity: 1) submittal of an individual application consisting of Forms 1 and 2F, 2) participation in a group application, 3) filing of a Notice of Intent (NOI) to be covered under a general permit in accordance with the requirements of an issued general permit.



III. Statutory Deadlines

The 1987 amendments to CWA established a deadline of February 4, 1990 for submission of permit applications for storm water discharges associated with industrial activity and discharges from large municipal separate storm sewer systems, and a deadline of February 4, 1992 for discharges from medium municipal separate storm sewer systems. The November 16, 1990 application rule provided certain deadlines for meeting the substantive requirements of that rulemaking which extended beyond the statutory deadlines. In response to concerns raised by the regulated community regarding the complexity of the regulations and the lack of general permits, EPA extended the deadline for submitting Part 1 of the group application from March 18, 1991 to September 30, 1991 and extended the deadline for submitting individual permit applications from November 18, 1991 to October 1, 1992. EPA also proposed to extend Part 2 of the group application deadline from May 18, 1992 to October 1, 1992. Deadlines for submission of applications for discharges from large and medium municipal separate storm sewer systems remain unchanged.

IV Water Quality Standards

Under the present statute, discharges associated with industrial activity (including municipally operated industrial activities) must comply with water quality standards. The statutory requirement that pollutants in discharges from municipal separate storm sewer systems be reduced to the maximum extent practicable has been interpreted to require compliance with water quality standards as well.

V Regulatory Approach

In order to implement EPA's long-term permitting strategy discussed above, the application regulations provide three options for obtaining permit coverage: 1) individual applications; 2) group applications, and 3) NOI to be covered under a general permit. This approach utilizes the flexibility provided by CWA in issuing NPDES permits. EPA intends to cover a majority of the storm water discharges associated with industrial activity under general permits initially. Coverage under general permits will gradually decrease as other permits are issued pursuant to Tier II through Tier IV activities.

FUTURE ACTIONS

General Permit Applicability

- Finalize baseline general permit for 12 States and 6 territories without NPDES authorization
- Assist NPDES authorized States in developing storm water general permits

Outreach

- Complete question and answer document
- Finalize Part 2 municipal permit application guidance
- Complete permit writers guidance documents
- Complete Reports to Congress
- Develop BMP/Pollution Prevention guidance
- Conduct additional storm water permitting workshops
- Conduct permit writers' workshops
- Complete group application process
- Prepare general information brochures
- Develop model mining general permit
- Target key professional organizations, trade associations and municipal organizations to develop partnerships
- Solicit feedback on necessary training and assistance from key organizations

United States Environmental Protection Agency | Office of Wastewater Enforcement and Compliance | April 1992

EPA

Major Issues In Recent Regulations Governing Storm Water Discharges

On April 2, 1992 the U.S. Environmental Protection Agency (EPA) published regulations addressing six major issues related to the National Pollutant Discharge Elimination System (NPDES) storm water program. (See 57 FR 11394.)

1. EPA's Long-Term Permitting Strategy

To regulate effectively the more than 100,000 storm water discharges associated with industrial activity, EPA or the authorized NPDES States first will issue Tier I baseline general permits to regulate most of these discharges. As priorities and risks are evaluated, Tier II through IV permitting activities will occur. Tier II permits will be issued to storm water discharges located in degraded or sensitive watersheds. Tier III permits will be issued for priority industry classes, and Tier IV individual permits will be issued for priority facilities.

The long-term permitting strategy also provides guidance for the development of State storm water permitting plans to provide public participation and to ensure implementation of storm water permitting activities.

2. Minimum Monitoring and Reporting Requirements

The rule gives permit writers additional flexibility to establish monitoring requirements for storm water discharges associated with industrial activity. These permit requirements will be established case by case, with a minimum requirement that industrial site operators inspect their facilities at least once a year to identify pollutant sources and to certify that their facilities are in compliance with their permits. Permit writers continue to have the authority to require additional monitoring on a case-by-case basis where appropriate.

3. Minimum Notice of Intent Requirements

The rule establishes a framework for permit writers to establish notice of intent (NOI) provisions for NPDES general permits. Discharges use an NOI to apply for coverage under an appropriate general permit issued by EPA or an authorized NPDES State.

Dischargers apply for coverage under a general permit by submitting a Notice of Intent (NOI). All NOIs must include, at a minimum, the following basic information: the legal name and address of the owner or operator of the discharging facility, the name and address of the facility that discharges the storm water; the type of facility or discharge; and the name of the stream or water body that receives the discharge. General permits may specify additional information that plicants must include in their NOIs.

4. Part 2 Group Application Deadline

The rule extends the deadline for submitting Part 2 of group applications from May 18, 1992 to October 1, 1992.

5. Clarification of How Many Facilities Must Submit Sampling Data in Part 2 of Group Applications

The rule clarifies that at least 50 percent of the facilities participating in a group of 4 to 20 members must submit sampling data in Part 2 of the group application. For groups with 21 to 99 members, at least 10 participants must submit sampling data. For groups of 100 to 1,000 members, at least 10 percent of participating facilities must submit sampling data. For groups with more than 1,000 members, no more than 100 participants must submit sampling data.

6. Codification of Transportation Act Deadlines

The Transportation Act of 1991 established several new application deadlines for certain storm water discharges from industrial activity owned or operated by municipalities. EPA's rule codifies these extensions into the NPDES regulations.

Individual permit application deadlines for municipally owned or operated industrial storm water discharges are to be submitted by October 1, 1992, with two exceptions: 1) municipal facilities that have been rejected from group applications must submit individual permit applications no later than the 180th day following the date of the denial, and 2) facilities owned or operated by municipalities with populations of less than 100,000 (excluding airports, power plants, or uncontrolled sanitary landfills) currently are not required to submit permit applications.

In addition, the Part 1 group application deadline for industrial facilities owned or operated by municipalities with populations of less than 250,000 has been extended from September 30, 1991 to May 18, 1992. The Part 2 application deadline has been extended from May 18, 1992 to May 17, 1993.

For More Information

Additional information about the NPDES Storm Water Program and related issues is available from the EPA Storm Water Hotline, (703) 821-4823

Cynthia C. Dougherty

Cynthia C Dougherty, Director, Permits Division, OWEC

APR 9 1992

Date

Overview

of the

Storm Water Program

U.S. Environmental Protection Agency
Office of Wastewater Enforcement and Compliance
Permits Division
401 M Street, SW
Washington, DC 20460

April 1992

STORM WATER PROGRAM

BACKGROUND

The 1972 amendments to the Federal Water Pollution Control Act (FWPCA, also referred to as the Clean Water Act or CWA) prohibit the discharge of any pollutant to waters of the United States from a point source unless the discharge is authorized by a National Pollutant Discharge Elimination System (NPDES) permit. Efforts to improve water quality under the NPDES program traditionally have focused on reducing pollutants in discharges of industrial process wastewater and from municipal sewage treatment plants. Efforts to address storm water discharges under the NPDES program have generally been limited to certain industrial categories with effluent limitations for storm water.

In response to the need for comprehensive NPDES requirements for discharges of storm water, Congress amended the CWA in 1987 to require the Environmental Protection Agency (EPA) to establish phased NPDES requirements for storm water discharges. To implement these requirements, EPA published the initial permit application requirements for certain categories of storm water discharges associated with industrial activity, and discharges from municipal separate storm sewer systems located in municipalities under a population of 100,000 or more on November 16, 1990 (55 FR 47990). Storm water discharge permits will provide a mechanism for monitoring the discharge of pollutants to waters of the United States and for establishing source controls where necessary.

ENVIRONMENTAL IMPACTS

Pollutants in storm water discharges from many sources are largely uncontrolled. The "National Water Quality Inventory, 1990 Report to Congress" provides a general assessment of water quality based on biennial reports submitted by the States under Section 305(b) of the Clean Water Act. The Report indicates that roughly 30% of identified cases of water quality impairment are attributable to storm water discharges. The States identified a number of major sources of storm water runoff that cause water quality impacts including separate storm sewers, construction, waste disposal, and resource extraction.

INDUSTRIAL FACILITIES COVERED

EPA has defined the term "storm water discharge associated with industrial activity" in a comprehensive manner to address over 100,000 facilities (see Attachment I for a complete definition and Attachment II for a discussion of the applicability of the definition). All storm water discharges associated with industrial activity that discharge through municipal separate storm sewer systems are required to obtain NPDES permit coverage, including those which discharge through systems located in municipalities with a discharges of less than 100,000. Discharges of storm water to a combined sewer system or to a Publicly Owned Treatment Works (POTW) are excluded. Facilities with storm water discharges associated with industrial activity include: manufacturing/industrial facilities; construction operations disturbing five or more acres; hazardous waste treatment, storage, or disposal facilities; landfills; certain sewage treatment plants; recycling facilities; powerplants; mining operations; some oil and gas operations; airports; and certain other transportation facilities. Operators of industrial facilities that are Federally, State or municipally owned or operated that meet the description of the facilities listed in 122.26(b)(14)(i)-(xi) must also submit applications.

TRANSPORTATION ACT OF 1991

The Transportation Act of 1991 provides an exemption from storm water permitting requirements for certain industrial activities owned or operated by municipalities with a population of less than 100,000. Such municipalities must submit storm water discharge permit applications for only airports, powerplants, and uncontrolled sanitary landfills that they own or operate, unless a permit is otherwise required by the permitting authority. The Transportation Act of 1991 also revises group application deadlines for facilities that are owned or operated by municipalities with a population of less than 250,000.

INDUSTRIAL APPLICATION OPTIONS

The storm water regulation presents three permit application options for storm water discharges associated with industrial activity. The first option is to submit an individual application consisting of Forms 1 and 2F. The second option is to participate in a group application. The third option is to file a notice of intent (NOI) to be covered under a general permit in accordance with the requirements of an issued general permit. The following overview briefly outlines each of these three options and the subsequent attachments provide a more detailed explanation.

A. INDIVIDUAL APPLICATIONS

Operators of facilities with storm water discharges associated with industrial activity that do not participate in a group application or obtain coverage under a general permit, must submit an individual application consisting of Form 1 and Form 2F. The information required in Form 2F includes a site drainage map, a narrative description of the site identifying potential pollutant sources, and quantitative testing data. There are specific requirements for construction activities and oil and gas operations and mining operations. See Attachment I for additional information.

B. GROUP APPLICATIONS

The group application procedure is an option available for facilities that have similar operations, waste streams and other characteristics. Group applications reduce the burden on the regulated community by requiring the submission of quantitative data from only selected members of the group. The group application is submitted in two parts. Part 1 of the application identifies all participants, provides facility specific information and proposes a representative sampling subgroup. EPA will approve or deny members of the group based on the information provided in Part 1. Part 2 of the application consists of sampling data from each member of the sampling subgroup identified in Part 1 of the application. The applicable data reporting portions of Form 2F, along with the certification, should be completed. See Attachment II for additional information.

C. GENERAL PERMIT - NOI REQUIREMENTS

Industrial storm water dischargers that submit a notice of intent (NOI) to be covered by the general permit are not required to submit an individual permit application or participate in a group application, provided the discharger is eligible for the permit and an individual permit application is not required by the Director. Submitting an NOI is significantly less burdens than submitting an individual application or participating in a group application. The NOI requirements for general permits usually address only general information and typically do not require the collection of monitoring data. NOIs only may be submitted where applicable general permits have been issued by the permitting authority. EPA has proposed (56 FR 40948, August 16, 1991) general permits in the 12 States without NPDES authorization. EPA strongly encourages authorized NPDES States to issue general permits where general permit authority is in place. As of April 1992, 29 of the 39 authorized NPDES States have general permit authority and a number of other States are close to receiving such authority. See Attachment III for additional information.

INDUSTRIAL PERMIT APPLICATION DEADLINES

Type of Application	Deadline	
• Individual	October 1, 1992	
• Group	Part 1	Part 2
All industrial activities except those owned or operated by a municipality with a population of less than 250,000.	September 30, 1991	October 1, 1992
Industrial activities owned or operated by a municipality with a population of less than 250,000.	May 18, 1992	May 17, 1993
• General Permit NOI	Deadline established in the general permit. EPA has proposed a 180 day deadline for its general permits (or by the individual application deadline, whichever is earlier).	

MUNICIPAL APPLICATIONS

"Municipal separate storm sewer" is defined as any conveyance or system of conveyances that is owned or operated by a State or local government entity designed for collecting and conveying storm water which is not part of a Publicly Owned Treatment Works. The application requirements do not apply to discharges from combined sewers (systems designed as both a sanitary sewer and a storm sewer). Municipal separate storm sewer systems that are addressed by the November 16, 1990 regulations include storm sewers located in one of 173 cities with a population of 100,000 or more; located in one of the 47 counties identified by EPA as having large populations in unincorporated, urbanized areas; and systems that are designated by the Director based on consideration of the location of the discharge with respect to waters of the United States, the size of the discharge, the quantity and nature of the pollutants discharged to waters of the United States, and other relevant factors. The operator of a designated conveyance system will be notified by the Director. Under the November 1990 storm water rule, those municipal separate storm sewer systems identified must submit two-part applications. The first part requires information regarding existing programs and the means available to the municipality to control pollutants. In addition, part one requires a field screening analysis of major falls to detect illicit connections. Building on this information, the second part requires a limited amount of representative quantitative data and a description of proposed storm water management plans. See Attachment IV for a detailed explanation of the two-part application process.

MUNICIPAL APPLICATIONS DEADLINES

	Part 1	Part 2
Large Municipalities	November 18, 1991	November 16, 1992
Medium Municipalities	May 18, 1992	May 17, 1993

ATTACHMENT I

INDIVIDUAL APPLICATION REQUIREMENTS

These requirements address storm water discharges associated with industrial activity that are not authorized by a general permit and that are not included in a group application.

APPLICATION FORMS	• Applicants for discharges composed entirely of storm water must submit **Forms 1 and 2F** • Applicants for discharges composed of storm water and process wastewater must submit **Forms 1, 2C, and 2F** • Applicants for new sources or new discharges composed of storm water and non-storm water must submit **Forms 1, 2D, and 2F** • Applicants for discharges composed of storm water and nonprocess wastewater must submit **Forms 1, 2E, and 2F** • Authorized NPDES States may establish their own forms which are at least as stringent as EPA's forms. • Forms are available from State permitting authorities for facilities located in NPDES authorized States, or from EPA Regional Offices for facilities located in States without NPDES authorization.
FORM 2F REQUIREMENTS	• Site map showing topography and/or drainage areas and site characteristics. • Estimate of impervious surface area and the total area drained by each outfall. • Description of significant materials exposed to storm water, including current materials management practices. • Certification that outfalls have been tested or evaluated for the presence of non-storm water discharges that are not covered by a NPDES permit. • Information on significant leaks and spills in last 3 years. • Quantitative testing data for the following parameters: - Any pollutants limited in an effluent guideline to which the facility is subject - Any pollutant listed in the facility's NPDES permit for process wastewater - Oil and grease, pH, BOD_5, COD, TSS, total phosphorus, nitrate plus nitrite nitrogen, and total Kjeldahl nitrogen - Certain pollutants known to be in the discharge - Flow measurements or estimates - Date and duration of storm event.

ATTACHMENT I

INDIVIDUAL APPLICATION REQUIREMENTS (Continued)

APPLICATION REQUIREMENTS FOR STORM WATER DISCHARGES ASSOCIATED WITH INDUSTRIAL ACTIVITY FROM CONSTRUCTION ACTIVITIES	• Provide a narrative description of: - Location and nature of construction activity (including a map) - Total area of the site and area to be excavated - Proposed measures to control pollutants in storm water discharges during and after construction operations - Estimate of runoff coefficient and increase in impervious areas after construction - Name of receiving water. • No quantitative sampling. • Application deadline - 90 days prior to date when construction begins. • EPA has not developed a standard form for these discharges at this time (Form 2F is not required).
APPLICATION REQUIREMENTS FOR STORM WATER DISCHARGES ASSOCIATED WITH INDUSTRIAL ACTIVITY FROM OIL & GAS OPERATIONS AND MINING OPERATIONS	• Operators of oil & gas facilities are not required to submit a permit application unless the facility: - Has had a discharge of a reportable quantity for which notice is required under CERCLA or CWA in the past 3 years, or - Contributes to a violation of a water quality standard. • Operators of active and inactive mining sites are not required to submit permit applications unless the discharge has come into contact with any overburden, raw material, intermediate or finished products, byproducts, or waste products located onsite (inactive coal mining operations released from SMCRA performance bonds and non-coal mining operations released from applicable State or Federal reclamation requirements after December 17, 1990 are not required to submit permit applications).
AVAILABLE GUIDANCE	*Guidance Manual For The Preparation of NPDES Permit Applications for Storm Water Discharges Associated with Industrial Activity*, available from the Storm Water Hotline, *(703) 821-4823*.
DEADLINE	October 1, 1992, or 180 days prior to commencement of a new discharge.

ATTACHMENT II

GROUP APPLICATION REQUIREMENTS

Facilities that discharge storm water associated with industrial activity had until September 30, 1991 to file a group application in lieu of submitting a complete individual application or a NOI to be covered by a general permit. The Transportation Act of 1991, however, extended the group application deadlines for certain industrial activities owned or operated by a municipality with a population of less than 250,000. Facilities that are part of the same effluent guideline subcategory or with similar activities and operations are eligible to submit a group application.

The group application is submitted in two parts. Part 1 of the application was due by September 30, 1991, and Part 2 of the application is due by October 1, 1992. These deadlines apply to all industrial activities except those owned or operated by a municipality with a population of less than 250,000. For these facilities, Part 1 of the application is due by May 18, 1992, and Part 2 of the application is due by May 17, 1993. EPA will review Part 1 and approve or deny the members in the group based on the information provided. Part 1 of the application must be complete, however, before a determination can be made by EPA. Both parts are submitted directly to U.S. EPA Headquarters, Office of Wastewater Enforcement and Compliance (EN-336), 401 M Street, SW, Washington, DC 20460, regardless of whether or not the included facilities are in a NPDES authorized State. The Transportation Act also addresses municipally owned or operated industrial activities that have been rejected or denied from the group application process. Such facilities must submit an individual application or be covered by a general permit within 180 days after the rejection or denial is made, or by October 1, 1992, which ever is later.

EPA will take both parts of the application and formulate model permit language for members of that group. The complete applications and model permit language will then be distributed to every NPDES authorized State or EPA Region (if the State is not NPDES authorized) in which participants are located. The State then reviews the application and model permit language. The State may consider the application and model permit language when issuing permits (either individual or general). The State may ask each or any of the applicants for more information on their facility and/or discharge if the State needs additional information. EPA Regional Offices will follow these same steps for participants located in States without NPDES authorization.

PART 1	• A list of participants by name, location, and precipitation zone • A summary of each participant's industrial activities • An explanation of why the participants are sufficiently similar • A list of significant materials stored outside by each participant and materials management practices • A list of representative dischargers that will submit test data in Part 2.
PART 2	• Quantitative testing data - For groups of four to twenty members, 50 percent of the facilities must submit data; for groups with 21 to 99, a minimum of 10 dischargers must submit quantitative data; for groups with 100 to 1,000 members, a minimum of ten percent of the facilities must submit data; for groups with greater than 1,000 members, no more than 100 facilities must submit data; there must be two dischargers from each precipitation zone in which 10 or more members of the group are located, or one discharger from each precipitation zone in which nine or fewer members are located. Testing requirements are described under 40 CFR 122.26(c)(1)(i)(E) and 40 CFR 122.21(g)(7).

ATTACHMENT II

GROUP APPLICATION REQUIREMENTS
(Continued)

ADDITIONAL INFORMATION	A model group application accompanied by detailed information on how to complete a group application is available from the Storm Water Hotline, *(703) 821-4823*. Technical support with regard to sampling procedures is also available from the hotline *(Guidance Manual For The Preparation of NPDES Permit Applications For Storm Water Discharges Associated With Industrial Activity)*.	
DEADLINES	Part 1	Part 2
ALL INDUSTRIAL ACTIVITIES EXCEPT THOSE OWNED OR OPERATED BY A MUNICIPALITY WITH A POPULATION OF LESS THAN 250,000	September 30, 1991	October 1, 1992
INDUSTRIAL ACTIVITIES OWNED OR OPERATED BY A MUNICIPALITY WITH A POPULATION OF LESS THAN 250,000	May 18, 1992	May 17, 1993

ATTACHMENT III

EPA PROPOSED BASELINE GENERAL PERMIT REQUIREMENTS

On August 16, 1991, EPA proposed for comment its draft baseline general permits (56 FR 40993) which are intended to initially cover the majority of storm water discharges associated with industrial activity in 12 States and 6 territories without authorized NPDES programs. The public comment period closed on October 15, 1991. The Agency hopes to finalize these permits by the spring of 1992. The EPA permits will also serve as models for States with authorized NPDES programs. As of April 1992, 29 of the 39 authorized NPDES States have authority to issue general permits and a number of other States are close to receiving such authority. Facilities in authorized NPDES States should contact their State permitting agencies to determine the status of the general permitting program. The following table outlines conditions in EPA's proposed baseline general permit.

TYPES OF FACILITIES COVERED	• The proposed baseline general permits can cover the majority of storm water discharges associated with industrial activity in a State. Storm water discharges associated with industrial activity that cannot be authorized by general permits include those: - With existing effluent guideline limitations for storm water - With an existing NPDES individual or general permit for the storm water discharges - That are or may reasonably be expected to be contributing to a violation of a water quality standard - From inactive mining or inactive oil and gas operations occurring on Federal lands where an operator cannot be identified.
AREAS OF COVERAGE	• EPA's proposed general permits cover the following 12 States and 6 Territories: - Alaska, Arizona, Florida, Idaho, Louisiana, Massachusetts, Maine, New Hampshire, New Mexico, Oklahoma, South Dakota, Texas, District of Columbia, the Commonwealth of Puerto Rico, Guam, American Samoa, the Commonwealth of the Northern Mariana Islands, and the trust territory of the Pacific Islands; on Indian lands in AL, CA, GA, KY, MI, MN, MS, MT, NC, ND, NY, NV, SC, TN, UT, WI, WY; from Federal facilities and Indian lands in CO and WA; and from Federal facilities in Delaware.

ATTACHMENT III

EPA PROPOSED BASELINE GENERAL PERMIT REQUIREMENTS (Continued)

NOTICE OF INTENT (NOI) REQUIREMENTS	• After the general permits are issued, a facility must submit a NOI to be authorized by the general permit. • NOI requirements are much less burdensome than individual permit applications and do not require the collection of discharge sampling data. • Facilities which discharge to a large or medium municipal separate storm sewer system must also submit signed copies of the NOI to the operator of the municipal system. • Operators of construction activities must also submit signed copies of the NOI to State or local agencies approving sediment and erosion or storm water management plans under which the construction activity is operating.
PROHIBITIONS	• Prohibition on non-storm water discharges as a component of discharges authorized by this permit. (These discharges should already have an NPDES permit.) • Prohibition on discharges that contain a hazardous substance in excess of reportable quantities established under the CWA or CERCLA (see 40 CFR Part 117.3, 40 CFR Part 302.4). These are priority discharges which are more appropriately covered by individual permits or other general permits.
POLLUTION PREVENTION PLAN REQUIREMENTS	• Operators of all facilities covered by the permit must prepare and implement a storm water pollution prevention plan. • For existing facilities, plans must be completed within 180 days of the effective date of the permit, and provide compliance with the plan within 365 days of the effective date of the permit. • For new facilities, plans must be completed and provide for compliance prior to submitting a NOI.

ATTACHMENT III

EPA PROPOSED BASELINE GENERAL PERMIT REQUIREMENTS (Continued)

BASELINE PLAN REQUIREMENTS	• Baseline pollution prevention plan requirements apply to all facilities except construction activities. (Additional special requirements for selected classes of facilities are discussed below.) • Baseline pollution prevention plans have 2 major objectives: - Identify potential sources of pollution - Identify and implement best management practices to reduce pollutants in storm water discharges.
ADDITIONAL PLAN REQUIREMENT FOR SALT STORAGE	• Facilities with storage piles of salt must enclose or cover the piles.
ADDITIONAL PLAN REQUIREMENTS FOR CERTAIN SARA TITLE III, SECTION 313 FACILITIES	• Special requirements only apply to facilities subject to SARA Title III, Section 313 for chemicals that are defined in the permit as "water priority chemicals." • Areas of the facility where large amounts of identified chemicals are used are subject to spill prevention and containment requirements similar to spill prevention, containment and countermeasure (SPCC) requirements for oil handling facilities. • Certain liquid storage areas are subject to secondary containment requirements or alternative spill and integrity testing requirements where secondary containment is not economically achievable.
ALTERNATIVE POLLUTION PREVENTION PLAN REQUIREMENTS FOR CONSTRUCTION ACTIVITIES	• Plan requires identifying potential pollution sources and implementing best management practices. • Best management practices include sediment and erosion controls and storm water management controls. • Plans must provide for compliance with approved State or local sediment and erosion control plans or storm water management plans.

ATTACHMENT III

EPA PROPOSED BASELINE GENERAL PERMIT REQUIREMENTS (Continued)

NUMERIC EFFLUENT LIMITATIONS	• Coal pile runoff: 50 mg/l TSS and 6-9 pH • Storm water discharges that come into contact with liquid storage or handling equipment or SARA Title III, Section 313 facilities are subject to an acute whole effluent toxicity limitation.
MONITORING REQUIREMENTS	• The proposed general permits provide that most dischargers covered by the permit must conduct annual monitoring of eight conventional parameters. Facilities subject to these 'baseline' monitoring requirements are not required to report monitoring results but must maintain records of monitoring data. • Six classes of industries must sample twice a year and report to EPA. These industries include: certain SARA Title III, Section 313 facilities; primary metal facilities; land disposal units; wood treatment facilities (wood preservers) using chlorophenolic/creosote formulations; wood treatment facilities (wood preservers) using arsenic/chromium preservatives; and coal pile runoff. • Operators of contaminated storm water discharges associated with industrial activity from oil and gas exploration and production operations, and from inactive mining operations where a past or present mine operator cannot be identified, have the option of either monitoring their storm water discharges associated with industrial activity annually, or, in lieu of the monitoring, have a Registered Professional Engineer certify that a storm water pollution plan has been prepared and is being implemented in accordance with the requirements of the permit.
DEADLINE FOR SUBMITTING NOI	• 180 days from general permit issuance (or by the individual application deadline, whichever is earlier) • For new discharges, at least 30 days prior to commencement of construction.

ATTACHMENT IV

MUNICIPAL APPLICATION REQUIREMENTS

The CWA requires that NPDES permits for discharges from municipal separate storm sewer systems include a requirement to effectively prohibit non-storm water discharges into the storm sewers, and controls to reduce the discharge of pollutants to the maximum extent practicable (including management practices, control techniques and system design and engineering methods, and other provisions appropriate for the control of such pollutants). EPA or authorized NPDES States may issue system-wide or jurisdiction-wide permits covering all discharges from a municipal separate storm sewer system. The November 1990 storm water final rule established requirements for a two-part permit application designed to facilitate development of site specific permit conditions. The permit application requirements provide municipal applicants an opportunity to propose appropriate management programs to control pollutants in discharges from their municipal systems. This increases flexibility to develop appropriate permit conditions and ensures input from municipalities in developing appropriate controls.

PART 1	• General information (name, address, etc.) • Existing legal authority and any additional authorities needed • Source identification information • Discharge characterization including: - Monthly mean rain and snow fall estimates - Existing quantitative data on volume and quality of storm water discharges - A list of receiving water bodies and existing information on the impacts of receiving waters - Field screening analysis for illicit connections and illegal dumping • Characterization plan identifying representative outfalls for further sampling in Part 2 • Description of existing management programs to control pollutants from the municipal separate storm sewer and to identify illicit connections • Description of financial budget and resources currently available to complete Part 2.

ATTACHMENT IV

MUNICIPAL APPLICATION REQUIREMENTS (Continued)

PART 2	• Demonstration of adequate legal authority to control discharges, prohibit illicit discharges, require compliance, and carry out inspections, surveillance, and monitoring • Source identification indicating the location of any major outfalls and identifying facilities that discharge storm water associated with industrial activity through the municipal separate storm sewer • Discharge characterization data including - Quantitative data from 5-10 representative locations in approved sampling plans - For selected conventional pollutants and heavy metals, estimates of the annual pollutant load and event mean concentration of system discharges - Proposed schedule to provide estimates of seasonal pollutant loads and the mean concentration for certain detected constituents in a representative storm event - Proposed monitoring program for representative data collection • Proposed management program including descriptions of: - Structural and source control measures that are to be implemented to reduce pollutants in runoff from commercial and residential areas - Program to detect and remove illicit discharges - Program to monitor and control pollutants from municipal landfills, hazardous waste treatment, disposal, and recovery facilities; SARA Title III, Section 313 facilities; and other priority industrial facilities - Program to control pollutants in construction site runoff • Estimated reduction in loadings of pollutants as a result of the management program • Fiscal analysis of necessary capital and operation and maintenance expenditures.
AVAILABLE GUIDANCE	*Guidance Manual for the Preparation of Part 1 of the NPDES Permit Application for Discharges from Municipal Separate Storm Sewer Systems*, available from the Storm Water Hotline, *(703) 821-4823*.

ATTACHMENT IV

MUNICIPAL APPLICATION REQUIREMENTS
(Continued)

DEADLINES	
	• Large municipal systems with a population of 250,000 or over: (55 FR 48073, November 16, 1990, Appendices F and H) Part 1: November 18, 1991 Part 2: November 16, 1992 • Medium municipal systems with a population of 100,000 to 250,000: (55 FR 48074, November 16, 1990, Appendices G and I) Part 1: May 18, 1992 Part 2: May 17, 1992

APPENDIX A

DEFINITION OF STORM WATER DISCHARGE ASSOCIATED WITH INDUSTRIAL ACTIVITY (40 CFR 122.26(b)(14))

"Storm water discharge associated with industrial activity" means the discharge from any conveyance which is used for collecting and conveying storm water and which is directly related to manufacturing, processing or raw materials storage areas at an industrial plant. The term does not include discharges from facilities or activities excluded from the NPDES program under 40 CFR Part 122. For the categories of industries identified in subparagraphs (i) through (x) of this subsection, the term includes, but is not limited to, storm water discharges from industrial plant yards; immediate access roads and rail lines used or traveled by carriers of raw materials, manufactured products, waste material, or by-products used or created by the facility; material handling sites; refuse sites; sites used for the application or disposal of process waste waters (as defined at 40 CFR 401); sites used for the storage and maintenance of material handling equipment; sites used for residual treatment, storage, or disposal; shipping and receiving areas; manufacturing buildings; storage areas (including tank farms) for raw materials, and intermediate and finished products; and areas where industrial activity has taken place in the past and significant materials remain and are exposed to storm water. For the categories of industries identified in subparagraph (xi), the term includes only storm water discharges from all the areas (except access roads and rail lines) that are listed in the previous sentence where material handling equipment or activities, raw materials, intermediate products, final products, waste material, by-products, or industrial machinery are exposed to storm water. For the purposes of this paragraph, material handling activities include the: storage, loading and unloading, transportation, or conveyance of any raw material, intermediate product, finished product, by-product or waste product. The term excludes areas located on plant lands separate from the plant's industrial activities, such as office buildings and accompanying parking lots as long as the drainage from the excluded areas is not mixed with storm water drained from the above described areas. Industrial facilities (including industrial facilities that are Federally, State, or municipally owned or operated that meet the description of the facilities listed in this paragraph (i)-(xi) include those facilities designated under the provision of 122.26(a)(1)(v). The following categories of facilities are considered to be engaging in "industrial activity" for purposes of this subsection:

(i) Facilities subject to storm water effluent limitations guidelines, new source performance standards, or toxic pollutant effluent standards under 40 CFR Subchapter N (except facilities with toxic pollutant effluent standards which are excepted under category (xi) of this paragraph);

(ii) Facilities classified as Standard Industrial Classifications 24 (except 2434), 26 (except 265 and 267), 28 (except 283 and 285) 29, 311, 32 (except 323), 33, 3441, 372;

(iii) Facilities classified as Standard Industrial Classifications 10 though 14 (mineral industry) including active or inactive mining operations (except for areas of coal mining operations no longer meeting the definition of a reclamation area under 40 CFR 434.11(l) because the performance bond issued to the facility by the appropriate SMCRA authority has been released, or except for areas of non-coal mining operations which have been released from applicable State or Federal reclamation requirements after December 17, 1990 and oil and gas exploration, production, processing, or treatment operations, or transmission facilities that discharge storm water contaminated by contact with or that has come into contact with, any overburden, raw material, intermediate products, finished products, byproducts or waste products located on the site of such operations; (inactive mining operations are mining sites that are not being actively mined, but which have an identifiable owner/operator; inactive mining sites do not include sites where mining claims are being maintained prior to disturbances associated with the extraction, beneficiation, or processing of mined materials, nor sites where minimal activities are undertaken for the sole purpose of maintaining mining claim);

(iv) Hazardous waste treatment, storage, or disposal facilities, including those that are operating under interim status or a permit under Subtitle C of RCRA;

(v) Landfills, land application sites, and open dumps that receive or have received any industrial wastes (waste that is received from any of the facilities described under this subsection) including those that are subject to regulation under Subtitle D of RCRA;

(vi) Facilities involved in the recycling of materials, including metal scrap yards, battery reclaimers, salvage yards, and automobiles junkyards, including but limited to those classified as Standard Industrial Classification 5015 and 5093;

APPENDIX A

DEFINITION OF STORM WATER DISCHARGE ASSOCIATED WITH INDUSTRIAL ACTIVITY (40 CFR 122.26(b)(14)) (Continued)

(vii) Steam electric power generating facilities, including coal handling sites;

(viii) Transportation facilities classified as Standard Industrial Classifications 40, 41, 42 (except 4221-25), 43, 44, 45, and 5171 which have vehicle maintenance shops, equipment cleaning operations, or airport deicing operations. Only those portions of the facility that are either involved in vehicle maintenance (including vehicle rehabilitation, mechanical repairs, painting, fueling, and lubrication), equipment cleaning operations, airport deicing operations, or which are otherwise identified under paragraphs (i)-(vii) or (ix)-(xi) of this subsection are associated with industrial activity;

(xi) Treatment works treating domestic sewage or any other sewage sludge or wastewater treatment device or system, used in the storage treatment, recycling, and reclamation of municipal or domestic sewage, including land dedicated to the disposal of sewage sludge that are located within the confines of the facility, with a design flow of 1.0 mgd or more, or required to have an approved pretreatment program under 40 CFR 403. Not included are farm lands, domestic gardens or lands used for sludge management where sludge is beneficially reused and which are not physically located in the confines of the facility, or areas that are in compliance with Section 405 of the CWA;

(x) Construction activity including clearing, grading and excavation activities except: operations that result in the disturbance of less than five acres of total land area which are not part of a larger common plan of development or sale;

(xi) Facilities under Standard Industrial Classification 20, 21, 22, 23, 2434, 25, 265, 267, 27, 283, 285, 30, 31 (except 311), 323, 34 (except 3441), 35, 36, 37 (except 373), 38, 39, 4221-25, (and which are not otherwise included within categories (ii)-(x));

Note: The Transportation Act of 1991 provides an exemption from storm water permitting requirements for certain industrial activities owned or operated by municipalities with a population of less than 100,000. Such municipalities must submit storm water discharge permit applications for only airports, powerplants, and uncontrolled sanitary landfills that they own or operate, unless a permit is otherwise required by the permitting authority.

APPENDIX B

APPLICABILITY OF THE DEFINITION OF "STORM WATER DISCHARGE ASSOCIATED WITH INDUSTRIAL ACTIVITY"

The term "storm water discharge associated with industrial activity" provided in Appendix A defines the scope of the industrial facilities potentially included under the storm water regulation. In order to determine the applicability of the regulation to a particular facility, the facility must examine its activities in relationship to the eleven categories of industrial facilities described under 40 CFR Part 122.26(b)(14). Facilities designated by five of the categories are identified by Standard Industrial Classification (SIC) codes (categories ii, iii, vi, viii, and xi); facilities designated by the other categories are identified by a narrative description of the industrial activities (categories i, iv, v, vii, ix, and x).

Identification of the appropriate SIC code for each facility is the responsibility of the applicant. In some cases, the applicable code may already have been identified for insurance, tax or accounting purposes. A complete listing of SIC codes and a detailed description of the structure of classification system is provided in a 1987 publication titled Standard Industrial Classification Manual published by the Office of Management and Budget. The manual is available at most major libraries in the reference section or is available for sale from the National Technical Information Service in Springfield, Virginia (order number PB 87-100012) (703) 487-4650. Some categories of industrial activity (categories i, iv, v, vii, ix, and x) under the definition at 122.26(b)(14) are not defined by SIC code but are defined by a narrative description of the activity. The activities described in these narrative categories should be carefully reviewed.

To determine if a certain industrial facility is required to submit a NPDES permit application for storm water, compare the 4-digit SIC code(s) assisted to each facility, with the SIC codes listed in 40 CFR Part 122.26(b)(14)(ii), (iii), (vi), (viii), or (xi). If the first two digits of the assigned code match with any two digit code in the regulations, then the industrial facility is required to submit a storm water permit application. If the first three digits in the assigned code match with any three digit codes in the regulation, the facility is regulated. If all four digits in the SIC code match any of the four digit codes in the regulation, the facility is regulated. Please note that the additional narrative descriptions in categories (iii), (viii) and (xi) should also be considered in determining applicability of the regulations.

For industrial facilities that are not identified by the SIC code categories, determine if the onsite activity meets a description of one of the narratives in categories i, iv, v, vii, ix and x. If the industrial activity for a facility is not included in 40 CFR 122.26(b)(14)(i)-(xi), the facility is not required to submit a NPDES permit application for storm water unless it is specifically designated by the permitting authority and contacted directly. In cases where a facility is designated and require to submit a storm water permit application, the permitting authority will contact the facility directly and inform them of all requirements and deadlines.

It is important to note that the scope of the NPDES program only covers discharges from point sources. A point source is defined at 40 CFR Part 122.2 as *any discernible, confined, and discrete conveyance, including but not limited to, any pipe, ditch, channel, tunnel, conduit, well, discrete fissure, container, rolling stock, concentrated animal feeding operation, landfill leachate collection system, vessel or other floating craft from which pollutants are or may be discharged. This term does not include return flows from irrigated agriculture or agricultural storm water runoff.* If a facility has neither a point source discharge of storm water to the waters of the United States nor to a municipal separate storm sewer system, the facility is not required to submit a NPDES permit application for their storm water discharge.

DRAFT

1/30/92

Joint Statement of Purpose
Office of Ocean and Coastal Resources Management, NOAA
Ocean and Coastal Protection Division, OWOW, EPA

In 1988, NOAA and EPA signed a coordination agreement to promote more effective management of resources, by increasing coordination and cooperation between the National Estuary Program (NEP) management conferences and State coastal zone management programs (CZMPs). We share a common goal: to maintain and enhance or protect the health of the nation's coastal resources To achieve this goal, all parties involved must gain a greater understanding of each other's programs. We are issuing this Joint Statement of Purpose to clarify and further implement the 1988 agreement.

NEPs and CZMPs are complementary. Each represents a different synthesis of techniques. CZMPs cover the coastal areas of entire states, but frequently do not encompass whole watersheds. NEPs, while focused on single estuaries, reach up a complete watershed. CZMPs are permanently established programs, working to maintain those goals they have achieved while continually striving for incremental progress toward the future. The NEP is a demonstration program, designed to achieve broad-based consensus for management actions in designated estuaries. NEP management conferences develop management plans (CCMPs) which are then implemented by various existing programs. The plans contain recommended actions but are not enforceable in and of themselves.

CZMPs, conversely (and as required by statute) must include enforceable policies, i.e., "...State policies which are legally binding through constitutional provisions, laws, regulations, land use plans, ordinances or judicial or administrative decisions, by which a State exerts control over private and public land and water uses and natural resources in the coastal zone." (CZMA, §304(6a)) As mature programs, CZMPs also have important experience in networking with various levels of government, in public involvement, in protecting resources, and in exercising the power of Federal consistency review.

Management Conferences convened under the NEP are charged with developing a plan for protection of natural resources and human health in nationally important areas. CZMPS are a vitally important tool for implementing Comprehensive Conservation and Management Plans (CCMPs) and achieving mutual goals. To that end, and as a means of achieving the goals and objectives of the 1988 NOAA-EPA Memorandum of Agreement, we are continuing to improve our understanding of each other's programs, and identifying in this joint statement steps to promote our mutual goal of natural resource protection.

Incorporation of the CCMPs into CZMPs

Wherever appropriate and possible, NOAA and EPA will encourage incorporation of CCMPs into State CZMPs by a formal process referred to as "program change." The CZMA requires that these program changes must be based on **enforceable** policies. CCMP action plans may include state and local commitments to refocus efforts under existing programs and authorities, as well as recommendations which will require additional authority. In the latter case, the development of enforceable polcies must occur prior to incorporation of the recommended action into the coastal program. EPA and NOAA expect that States will adopt enforceable policies in order to achieve CCMP goals. As noted in the definition provided earlier, these policies can be not only State level laws and regulations, etc, but also local management mechanisms such as zoning codes over which the State has some oversight.

Integrating these policies into Federally-approved coastal management programs will provide an important avenue for implementation of the CCMP. Once included, implementation may be funded with Federal CZM dollars. While enforceable policies form the basis of program changes, the effort as a whole may be implemented by the CZM program. For example, where a new law has been promulgated, CZM might implement a public education and outreach program, as well as an enforcement effort.

Furthermore, once CCMP action plans are an approved part of a CZMP, States may review Federal activities, permits and Federally funded projects for consistency under the CZMA. Although §320 of the Clean Water Act provides for Federal consistency review, CZM consistency is well established and extends to Federal **permits**, as well as to Federal activities and Federally funded projects.

To encourage the development of enforceable policies, EPA intends, within the limits of existing granting authority, to make additional funds available, beginning in FY92, to assist NEP Management Conferences during their final year with the development of enforceable policies and other activities and mechanisms to effectively implement NEP management recommendations. EPA's guidance will include direction on the development of enforceable policies and incorporation of action plans into the CZMP.

Recognizing the need for expedited implementation, many of the more recent NEPs are striving to produce a draft CCMP in three years. Should any new National Estuaries be designated, EPA will continue to strongly encourage the early development of CCMPs.

Involvement of CZMPs in the Development of CCMPs

To increase effectiveness and to expedite the incorporation of parts of the CCMPs into CZMPs, NOAA and EPA will work with the

States to ensure that CZM program experiences and expertise are brought to bear during development of NEP management plans. EPA will require that where the lead state agency for the NEP is different than the CZM agency, the two agencies develop an MOU describing how the CZM and NEP programs will be coordinated at the state level.

Where the CZMP resides in the same agency as the NEP lead, EPA will work with that agency to ensure that CZM staff are available to assist the NEP committees. In response to EPA efforts, NOAA will assist the CZMP in providing technical assistance, advice and management input to the NEP.

CCMP Consistency Determination

In the 1988 MOA, EPA agreed, as a matter of policy, to submit final CCMPs to the State CZM agencies for consistency review, per §307(c)(1) of the Coastal Zone Management Act. To implement this agreement, EPA will provide written guidance on the consistency process and requirements. Regional EPA offices will be responsible for developing the consistency determination for the final CCMP and providing it to the State CZM agency at least 90 days prior to the EPA Administrator's decision on whether or not to approve the CCMP. In any case where the CZM agency objects to the consistency determination, EPA will attempt to resolve the differences within the NEP Management Conference framework or seek the assistance of the Secretary of Commerce prior to approval of a CCMP. Under CZMA §307(c)(1)(A), CZM programs review any activity that affects any land or water use or natural resource of the coastal zone, whether that activity occurs within or outside the coastal zone.

Early involvement of CZM agencies in developing the CCMPs will likely preclude any need for a finding of inconsistency with the coastal program. As a partner in the process, the CZM agency can point out potential problems as early as possible, and solutions can be negotiated. While the statutory consistency review must still occur, it is the hope of both EPA and NOAA that the review will be "pro forma," all possible inconsistencies having been addressed and alleviated at an earlier stage.

Coordination on Development of §6217 Nonpoint Source Pollution Control Programs

§6217, passed in 1990 with the Coastal Zone Act Reauthorization Amendments, mandates a new level of cooperation between State water quality and coastal management agencies to address nonpoint source pollution in coastal watersheds. This requirement for a coordinated program (a Coastal Nonpoint Pollution Control Program, or CNPCP) which utilizes best available management practices implemented by existing programs, provides new opportunities to work together. Nonpoint source pollution has been an area of concern for all NEPs. Data collected, analyses performed, and strategies selected by the CCMPS will be an

important source of information for the development of State CNPCPs. Funds available under §6217, as well as Clean Water Act §319 might also be directed toward nonpoint source problems in NEPs. EPA and NOAA will make every effort to ensure that Management Conferences play a meaningful role in developing these control programs.

Program Evaluations

To assist in coordination of the NEPs and CZM programs, OCRM will invite participation, where appropriate, from EPA regional staff in performing §312 evaluations of coastal zone management programs. When 312 evaluations are scheduled in States that contain NEPs, OCRM will notify EPA headquarters well in advance of the evaluation dates. OCRM will ensure that concerns and issues raised by EPA regarding CZMP-NEP interactions are reviewed during the evaluation.

EPA will also invite OCRM, as well as representation from State coastal management agencies, to participate in a project to develop an evaluation and feedback process for the NEP.

Periodic Meetings

To continue implementation of the 1988 agreement between NOAA and EPA, and encourage increased interactions between the programs, OCRM and OCPD have held a number of meetings, including a one day joint workshop with OCRM, OCPD and EPA's Nonpoint Source Division, and several smaller meetings, as well as a workshop in Seattle with academic representatives and state and local practitioners. We plan to continue informal periodic meetings between staff.

NEPOLICY.DOC

OCPD-Regions Branch Chiefs' Meeting

February 4-6, 1992
Santa Fe, New Mexico

Meeting Summary

OCPD-REGIONS BRANCH CHIEFS' MEETING

February 4-6, 1992
Santa Fe, New Mexico

MEETING SUMMARY

OCPD ACTION ITEMS

1. Send OCPD vacancy announcements to Regions. (Craig Vogt)

2. Revise draft final NEP Program FY 92 Funding Guidance to clarify eligibility to receive funds and to note that while environmental monitoring cannot be financed with post-CCMP funds, it may be funded by base programs (Mark Curran)

3. Send Regions an information package on NEP nominations. (Mark Curran)

4. Identify potential changes to NEP workload model. (Mark Curran)

5. Conduct conference call on NEP conflicts of interest. (Mark Curran)

6. Draft a white paper, with Regional help, on leveraging resources for NEPs. (Mark Curran)

7. Meet with Soil Conservation Service (SCS) to discuss funding available for estuarine studies and future work together. (Mark Curran)

8. Develop a questionnaire and send it to Regions to gather inputs for ocean dumping workload model to help support FY 94 budget request. (John Lishman)

9. Investigate potential changes to the ocean dumping workload model. (John Lishman)

10. Allocate FY 92 §301(h) and §403(c) Regional program funds, evaluate possible changes to distribution formulas, and distribute the analysis to Regions for comment. (John Lishman)

11. Prepare paper on relationship between the §403 and §402 programs. (John Lishman)

12. Distribute another draft of §301(h) rules to Regions for review prior to workgroup closure. (John Lishman)

13. Assess overall program information management (e.g., ODES and STORET), soliciting Regional input to identify key issues and problems. (Karen Klima)

14. Work with Regions to ensure that technical assistance workshops are well focused. (Karen Klima)

15. Conduct customized monitoring training programs for Regions. (Karen Klima)

16. Send *Coastlines* mailing list to Regions for updating and identify methods for Regions to submit articles for publication. (Karen Klima)

17. Monitor the development of EPA pollution prevention policies and resulting program interaction opportunities. (Karen Klima)

18. Distribute the current draft EPA-COE MOU to the Regions for review. (John Lishman)

19. Clarify laboratory certification program authorities and roles and consider addressing them in the EPA-COE MOU. (John Lishman)

20. Design the planned enforcement training program to satisfy EPA requirements for program-specific enforcement training. (John Lishman)

21. Conduct further analysis and begin preparing guidance materials on capping policies. (John Lishman)

22. Send information on a general enforcement training course to Region IX. (John Lishman)

23. Evaluate the potential next steps in developing bioaccumulation guidance. (John Lishman)

24. Distribute draft proposed ocean dumping regulations (without preamble) to Regions. (John Lishman)

25. Begin developing guidance on the relation between the §404 and §103 programs by meeting with the §404 staff, identifying statutory and regulatory concerns, and conducting a conference call with Regions. (John Lishman)

26. Publish the Near Coastal Waters guidance and specify how NCW resources will be allocated to the Regions. (Mark Curran)

27. Make the normal process of distributing documents from OCPD to the Regions to be as follows: fax copies of key draft documents for review and other important documents to (1) the Regional Division Director and (2) to the Section Chief or other person designated by the Region. (Craig Vogt)

28. Disseminate a revised list of OCPD-sponsored meetings and training. (Craig Vogt)

29. Distribute a package of information regarding the ability of OCPD to fund certain Regional training expenses. (Karen Klima)

30. Prepare FY 94 budget requests that are tied to the Narragansett mid-Atlantic Bight initiative and link dredged material programs to pollution prevention initiatives. (Craig Vogt)

31. Examine rapid bioassessment development. (Karen Klima)

32. Send copies of the Estuarine Health Guidance from the Gulf Program to Regions. (Karen Klima)

REGIONAL ACTION ITEMS

1. Assist OCPD in providing information to support the development of the FY 94 budget for NEPs.

2. Review draft #3 streamlined NEP guidance.

3. Assist in developing a draft white paper on leveraging resources for NEPs. (Mario Del Vicario)

4. Send to Region IV the Region I Counsel's opinion on conflicts of interest for NEP committee members who may seek NEP consulting contracts. (Gwen Ruta)

5. Meet with state SCS offices to discuss funding available for estuarine studies and provide feedback to OCPD.

6. Review draft questionnaire regarding ocean dumping activities and submit data required by final questionnaire.

7. Participate in NOAA natural resource damage assessment and remediation activities, including technical advisory committees.

8. Identify communities likely to apply or reapply for a §301(h) waiver.

9. Submit information on benefits of secondary treatment for Narragansett Bay to Karen Klima. (Gwen Ruta)

10. Send Karen Klima a copy of Region I NEP success stories. (Gwen Ruta)

11. Inform OCPD of the effectiveness of civil penalties in enforcing OCPD programs. (Charles App)

12. Send a copy of the EPA administrative order regarding program-specific training requirements to OCPD. (Loretta Barsamian)

13. Keep OCPD informed of communications with OST regarding the Green Book, Gold Book, sediments quality criteria, and sediments strategy by sending copies of comments to Dave Redford.

14. Review draft Management Strategy regarding capping and submit comments to OCPD.

15. Send schedules for developing Regional testing manuals to OCPD.

16. Identify the fax numbers for (1) Division Director and (2) Section Chief or other individual designated to receive key draft documents for review and other important documents.

17. Review revised list of OCPD meetings and training, and indicate ranked priorities and likely participants (numbers and names, if available).

18. Assume that OCPD Regional Reviews will not duplicate OWOW reviews.

19. Send Estuarine Health Guidance to Karen Klima. (Fredrick Kopfler)

TUESDAY, FEBRUARY 4, 1992

OCPD Programs: Updates, Status, Issues, and Priorities

Marian Mlay described the substantial progress made by OCPD since the meeting in Charlottesville last year. She noted that:

- OWOW is now operating as a team.
- OCPD has completed its reorganization; is recruiting for new section chiefs; plans to be fully staffed in the next few months; and has completed its FY 92 agenda.
- The following major policy issues have been resolved: new NEPs, post-CCMP funding, and NCW guidance. In addition, the Urban Institute has begun its evaluation of the NEP program and OCPD has streamlined the financial process for APDPs, §301(h), and §403(c).
- The major issues facing OCPD include funding for the ocean dumping, §301(h) and §403(c) programs, allocation of Anderson time and costs, and the overall FY 94 budget development.
- OCPD will continue to develop team work and cooperation among the Coastal Zone, NEP-NCW, and non-point source programs.
- OCPD faces a challenge in meeting the needs of its customers through technology application and transfer, and plans to increase its outreach activities after hiring new staff in that area.
- Regional-HQ communications have improved, but we are working to improve it further.

Regional Programs: Updates, Status, Issues, and Priorities

Regional representatives identified the following key concerns:

- NEP implementation
- The relationship between the §103 and §404 programs
- Leveraging other programs to help NEP implementation
- Management of contaminated dredged material
- Capping policy and dealing with the Army COE

- Potential reopening of §301(h)
- Linking NEP, ocean dumping, and other efforts to geographic initiatives
- The lack of support for implementing ODBA when ocean dumping fees and FTEs end
- Green Book implementation
- Coordination with SCS and other agencies
- Possible designation of fish disposal sites
- Development of environmental indicators
- National marine sanctuaries and their relationship to ocean dumping
- Uncertainty about new NEP nominations
- Conflict of interest for contractors who serve on NEP boards
- The Watershed Protection Approach
- The status and future of the Coastal America program
- Coordination of program elements within OCPD
- Resources limitations

NEP

1. **NEP Program FY 92 Funding Guidance.** The Regions agreed that the document was generally well done. The issues discussed included methods of distributing funds for CCMP implementation; the budget for FY 92; development of FY 94 budget; the schedule for plan submission and review; the desire to progressively increase the speed of disseminating funds at start of fiscal year, which could effectively increase the available annual budget; excluding data collection from eligible funding activities; and the need to keep the program focus clear.

2. **New NEPs.** OCPD plans to publish a *Federal Register* notice on new nominations by the end of February. The meeting notebook contains a draft notice. The Regions will review the draft and submit their comments to OCPD. OCPD will send Regions an information package on NEP nominations by time of the publication of the *Federal Register* notice. The Regions expect that states will nominate San Diego Bay, Lower St. Johns River, Corpus Cristi Bay, and Lower Columbia River, in addition to Morro Bay and Mobile Bay.

3. **Streamlined NEPs.** The draft streamlined NEP guidance is structured to be compatible with (i.e., not require changes in) the current guidance.

The meeting notebook contains a copy of draft #3, for review by the Regions. The Regions recommended that the draft and preliminary CCMPs should be combined because of the effort required to draft a CCMP. The participants also noted that complicated estuaries may be unable to meet the four-year streamlined schedule and may not be ready for acceptance into the NEP program. These estuaries could be addressed further under the Near Coastal Waters program.

4. **Program Evaluation.** The Urban Institute is designing an NEP program evaluation protocol. It will include interviews with NEP participants and a project assistance panel composed largely of NEP program customers.

5. **FTEs for NEPs.** Regions generally agreed that, contrary to initial expectations, resource needs will not disappear when CCMPs are being prepared. Changes to the workload model to reflect this development may be possible pending a decision by OW. OCPD will prepare proposed changes to the model in case change is possible. The discussants agreed to the following suggestions concerning the model:

   - The pricing factors for current NEPs should remain unchanged;
   - The pricing factors for new NEPs should show level funding throughout the streamlined four-year process; and
   - The appropriate minimum level of FTEs is two per year for non-complicated (e.g., single state, small) estuaries. (All the expected new NEPs, except the Lower Columbia River, should be non-complicated estuaries.)

6. **Conflicts of Interest.** The group discussed the issue of whether and when a member of an NEP committee, such as a technical advisory committee, is ineligible to seek funding for consulting projects related to the NEP. Several Regions and states have already addressed the issue. After Region VI and OCPD gather additional information, OCPD will schedule a conference call on the topic.

7. **Leveraging Resources for NEP Implementation.** OCPD is starting to meet with other agencies to discuss NEP coordination, funding, and related issues. OCPD's priorities are NOAA, Department of Agriculture, SCS, Fish and Wildlife Service, and FDA. Regions will meet with state SCS offices and provide feedback to HQ on these meetings. OCPD, with assistance from Region II, will develop a white paper on "leveraging" resources to implement NEPs. The paper will discuss priorities for coordinating with other agencies and within EPA. OCPD will circulate a draft paper for Regional review and comment.

Ocean Dumping Workload Model

1. John Lishman described the model and recent analysis of the results of the model using Regional data for FY 94 under various assumptions. The results show that the program is underfunded and that a decrease in funding from FY 90 levels is not warranted.

2. The participants made the following comments on the model:

- The inputs need to be updated and made more consistent across Regions.

- Several activities are not reflected in the model, such as:

  -- Enforcement, including illegal dumping surveillance and RCRA enforcement assistance;

  -- Searching for alternative sites;

  -- Site recovery studies;

  -- Marine debris; and

  -- Emergency response.

- Perhaps the base allocation to the Regions should reflect these activities.

- The pricing factors are too low, especially for medium and small projects.

- Special initiatives should be eliminated as a funding category.

- The extramural dollar workload model favors the West Coast.

- The model should distinguish permit denials and approvals because they require significantly different levels of effort.

3. The current model, despite its limitations, may be helpful for budget defense purposes. To improve the use of the model, OCPD will develop a questionnaire, with Regional assistance, to collect more consistent and more clearly defined inputs. Subsequently, OCPD will investigate modifying the model for future use.

4. OCPD will request that Regions provide brief year-end statements regarding ocean dumping program accomplishments that track model inputs.

WEDNESDAY, FEBRUARY 5, 1992

Point Source Programs

1. The development of advanced risk assessment techniques may create pressures for changes in the §301(h) and §403(c) programs.

2. Karen Klima discussed the briefing for Administrator Reilly on national wastewater management policies. (See meeting notebook.) The Administrator desires to increase the use of risk-based approaches. OCPD is concerned about the administrative difficulties involved in reopening the §301(h) process.

3. Gwen Ruta noted that data from Narragansett Bay demonstrated that implementation of secondary treatment reduced sediment contamination levels. She will provide OCPD with information about this case study, which OCPD will include in its analysis of the benefits of secondary treatment.

4. NOAA/DOJ prosecution of natural resource damage cases could create opportunities to fund related EPA programs. Regions will therefore seek to participate in NOAA natural resource damage assessment and remediation activities, including technical advisory committees.

§403(c) and §301(h) Programs

1. The FY 93 budget for these programs is 38 percent less than the FY 92 budget.

2. John Lishman asked Regions whether the funds for these programs should be distributed through a formula or on a case-by-case basis. Under the former option, OCPD could distribute the funds faster. OCPD will develop a draft budget allocation for Regional review and comment.

3. Funds will be allocated directly to Regions for §301(h), §403(c), and APDPs without work orders. Because OCPD remains responsible for the funds, Regions must report their use of funds at year-end.

4. Priorities for special projects include delegated states, information management, use of information collected by ODES, and technical applied research.

5. To justify increasing the FY 94 budget to FY 92 levels, OCPD will develop data on Regional workloads, including permit renewals. OCPD will also review the budgetary implications of opening up the §301(h) process. OCPD may seek data from Regions for this analysis.

6. Other issues discussed include:

   - CWA reauthorization proposals to extend §403(c) review to estuaries;
   - Development of §403(c) regulations;
   - Need for guidance on the interface of §402 and §403, which OCPD agreed to start developing;
   - Focusing §403(c) review to critical issues such as sensitive habitats and stressed waters; and
   - The 30 percent reductions issue.

7. OCPD will circulate another draft of §301(h) rules for Regional review prior to workgroup closure.

Information Management/ODES Policy

1. OCPD will assess data collection and use, starting with a problem definition broader than "what is wrong with ODES." OCPD will solicit Regional input on the initial identification of key issues and problems.

2. This assessment will address the major issues discussed by the group, including:

   - How ODES should provide the data needed for decision-making;
   - Data quality problems with STORET;
   - Need for carefully focused training;
   - The value and difficulty of establishing a minimum data set;
   - Developing an effective data collection and use policy (e.g., linking data input into ODES with funding decisions);
   - OCPD's commitment to ODES; and
   - The importance of data not gathered under EPA-sponsored projects.

Technical Information Transfer and Outreach/Education

1. OCPD seeks to be more systematic in identifying and disseminating lessons learned over the past decade.

2. Karen Klima described OCPD's proposed approach to develop a technical assistance strategy. (See meeting notebook.) Regional representatives questioned the desirability of using workshops to help identify specific projects and goals and emphasized the importance of focusing on key issues. One option suggested was to survey existing organizations (e.g., NEP committees) or otherwise asking for suggestions from these groups. The participants generally agreed that a strategy is needed and that it should consider both the consumers and providers of technology transfer.

3. Gwen Ruta agreed to sent Karen Klima a copy of Region I NEP success stories.

Updates

1. **Marine Debris.** The participants agreed that future program priorities should including developing a rationale for direct funding and increasing national cohesion and consistency.

2. **Coastal America.** This program received no direct funding for FY 92 or in the FY 93 budget submitted to Congress. The Regions largely agreed that while this program has helped in coalition building, it has limited promise without direct funding.

3. *Coastlines*. OCPD will distribute the publication's mailing list to Regions for updating. OCPD plans to expand the publication's focus and identify how Regions may submit articles.

4. **Watershed Protection Approach**. John Pai described the status of the WPA. He noted that over 50 projects have been proposed for the program and that, while the sponsors strongly believe in the projects, others have expressed reservations about the program. He recommended the development of an internal EPA coordination committee as well as an external coordination committee.

5. **Gulf Program**. The program has been reorganized to report to the Assistant Administrator for Water. President Bush announced $21 million for Gulf in the FY 93 budget; however, we have not received a listing of how these funds are to be allocated to the Gulf Program The Program is helping establish a Caribbean Institute, whose purpose remains to be clarified. GAO is conducting a study that may provide the basis for funding the Gulf program. The program faces the important task of developing action plans for its primary issues (e.g., marine debris, public health).

6. **Water Civil Enforcement Penalties to Fund NEP/NCW**. Charles App discussed the possibility of using civil enforcement penalties to fund NEP and NCW studies. He distributed a summary of EPA's policy on the use of enforcement penalties, which requires a close connection between the violation and the specific study funded by the penalties. In some cases the penalties may be used to fund NEP/NCW studies. Such studies could be pitched as addressing pollution prevention, which can often be funded by penalty funds.

7. **Marine Sanitation Devices**. Legislation before Congress (e.g., S. 1081) addresses MSDs. Key MSDs issues include enforcement, problem characterization, technological innovation, the availability of pump out capacity, outreach to boaters and marinas, and the no discharge justification. Regions noted that current problems include the lack of program funding, the need for mobile pump out capacity because boaters are unwilling to wait in line, and the lack of enforcement. The §404 program in Region 2 is requiring pump out facilities as a condition for marina expansion permits.

8. **Monitoring: Training and Assistance**. OCPD is willing to conduct region-based training programs, if requested, in addition to the program course for Galveston NEP. Region IV requested training for the Florida NEPs.

9. **ORD Research Needs/Strategy**. ORD is developing issue papers covering research needs over the next five years. OCPD is carefully watching the development of these papers, as they do not appear to be directly linked to OCPD's research needs strategy.

10. Anderson. OCPD is developing a formal policy on chief scientist certification and training. Chief scientist training is planned for the early summer. The Division also plans to develop a more structured scheduling process and a fee system for the Anderson.

11. **Sea Level Rise.** This potential problem is generally not addressed by NEPs. Buzzards Bay is an exception.

12. **NPS + CZM - 6217.** This topic was also discussed briefly.

THURSDAY, FEBRUARY 6, 1992

Dredged Material

1. **New EPA-COE MOU.** John Lishman is working with the Army COE to develop a new MOU to replace the existing MOU, which expires this July. OCPD plans to make the MOU as specific as possible, which will reduce the difficulties in developing regional MOUs. The Regions agreed with this approach. OCPD will distribute the current draft MOU for Regional review.

2. **Training.** OCPD plans to conduct training courses on the enforcement of marine and coastal pollution laws. The courses will be designed for program staff, not enforcement attorneys. OCPD will design the training to satisfy EPA requirements for program-specific enforcement training for staff involved in enforcement actions. In addition, a free slot in a general enforcement training course by the Environmental Law Institute is available. OCPD will send information on this course to Region IX.

3. **Proposed ODA Regulations.** OCPD will distribute draft Ocean Dumping Act regulations, without preamble text, to the Regions within a month. OCPD plans to provide proposed changes before the ocean dumping coordinators meeting, which is scheduled for the first part of April.

4. **Sediment Quality Criteria.** The sediment quality criteria are approaching Red Border Review. OCPD is working with OST on several areas, including the scientific uncertainty, field testing, the extrapolation from acute to chronic toxicity, and the analysis of economic or programmatic impacts. OCPD requested that Regions keep OCPD informed of their comments on the criteria, contaminated sediments strategy, draft Gold Book, and future revised Green Book.

5. **Legislative Activity.** Senate Bill 1081 is a likely vehicle for Clean Water Act Reauthorization. A revised discussion draft of S. 1081 excludes wetlands and §404 issues and would amend MPSRA. Separate legislation would reauthorize MPSRA with a $14 million authorization, amending the Act only to allow seizure of boats violating the law. The Studds bill to amend MPSRA would establish a new liability regime.

6. **Regional Testing Manuals.** OCPD requested that the Regions send the Division their schedules for developing regional testing manuals. Regions could use guidance on decision guidance values, bioaccumulation tissue results, and capping.

7. **Other Issues.** Other topics discussed included defacto capping, lab certification and testing procedures, and the accuracy and applicability of the Addams mixing zone model.

§103/§404 Interaction

1. The interaction of the §103 and §404 programs creates a conundrum because both programs limit the disposal of contaminated sediment based on the availability of alternative sites. The Regions seek guidance on how to weigh the choices between dumping in the ocean versus in a §404 area. OCPD will begin developing guidance on the best approach to this issue by meeting with the §404 staff, identifying the relevant statutory and regulatory concerns, and scheduling a conference call on the topic.

2. Private firms are promoting the use of upland wetlands in the San Francisco Bay area to dispose of dredged materials.

3. The participants also noted the problem of the §404 program using contaminated sites as reference sites, which reduces its level of protection, and discussed the allocation of responsibility over dredging issues between OCPD and the §404 program, including a suggestion to place all §404 dredging issues into the §103 program.

Near Coastal Waters

1. NCW Guidance. OCPD will soon issue the NCW guidance.

2. Policy Issues.

   - Although several regions suggested deleting or modifying the limitation of data collection and analysis to 20 percent of the budget, OCPD will retain the restriction, with a limited opportunity for reopening.

   - The guidance uses "must" to refer to process issues and "should" to refer to the substantive issues.

   - OCPD will continue to approve annual regional funding plans because of the newness of the guidance and historical "ambiguity" of the program. Marian Mlay noted, however, that the §301(h), §403(c), and APDP programs, have been delegated to the Regions.

   - OCPD intends that NCW efforts focus on choosing a few high priority sites from the Regional strategy and focusing regional efforts at those sites.

3. Funding Issues.

   - The Regions expressed different preferences for allocating NCW resources to the Regions. They did not reach a consensus on a specific formula.

   - The group, however, agreed that OCPD would make FY 92 budget decisions within a week or so, after consulting with Loretta Barsamian.

- OCPD will compare data used for this allocation (e.g., population figures) to be consistent with data used by wetlands program to allocate its resources and consider using their formula to make adjustments for the length of the Alaska coastline.

- The discussants agreed that the resource allocation formula would be more important in the future if the total NCW budget increases.

Program Management

1. **Document Dissemination.** The group discussed the problem of disseminating key documents to Regional staff. OCPD agreed to fax copies of key draft documents for review and other important papers to (1) the Division Director and (2) to the Section Chief or other person designated by the Regions. The Regions will identify the fax numbers for each of these individuals.

2. **OCPD-Sponsored Meetings.** The participants reviewed the schedule of OCPD-sponsored meetings and made some adjustments. OCPD will send a revised list to the Regions.

3. **Training Funding.** Parts of training costs may be paid for with AC&C funds. For OCPD-sponsored training sessions, OCPD will generally fund the food and lodging. The use of AC&C funds is possible only upon documentation of the training program content and costs. OCPD will send a package of information concerning these requirements to the Regions.

PARTICIPANTS

OCPD:	Marian Mlay, Craig Vogt, Mark Curran, Karen Klima, John Lishman, Dave Redford
OWOW:	John Pai
Region I:	Gwen Ruta
Region II:	Mario Del Vicario
Region III:	Rich Pepino, Charles App
Region IV:	E. Stallings Howell, Bo Crum
Region VI:	Richard Hoppers, George Horvath
Region IX:	Loretta Barsamian
Region X:	Jack Gakstatter
Gulf of Mexico Program:	Fredrick Kopfler
ICF Incorporated:	Mike Berg

EPA

Office of Wetlands, Oceans and Watersheds

Oceans and Coastal Protection Division

4/20/92

NOTE:

SUBJECT: Action Items from OCPD-Regions Branch Chiefs' Meeting in Santa Fe

FROM: Marian Mlay

TO: OCPD and Regional Branch Chiefs

I have attached a list of the action items that fell to OCPD at the Branch Chiefs' meeting in February, along with the actions we undertook, or plan to undertake, in response to the items. I have attached a list of the action items that fell to the Regions as well. In preparation for the OWOW National Meeting in May, I would like each regional Branch Chief to look through your Region's respective action items and update OCPD on actions taken to date, or the responses you are planning.

Please have your responses to Macara Lousberg, the Program Analyst on my staff, by COB Friday, April 24. As you can see by looking at the responses OCPD prepared for its action items, you do not need to go into a lot of detail. I would just like a brief description of progress on each item. If you have any questions, you can call Macara at 202-260-9109.

Thanks to all of you, and I look forward to seeing you at the National Meeting.

Marian

Marian Mlay

Attachments

OCPD-REGIONS BRANCH CHIEFS' MEETING

February 4-6, 1992
Santa Fe, New Mexico

OCPD ACTION ITEMS AND RESPONSES

1. Action: Send OCPD vacancy announcements to Regions. (Craig Vogt)

   Response: Done. Sent out by Branch Chiefs.

2. Action: Revise draft final NEP Program FY92 Funding Guidance to clarify eligibility to receive funds and to note that while environmental monitoring cannot be financed with post-CCMP funds, it may be funded by base programs. (Mark Curran)

   Response: Final NEP FY92 Funding Guidance was issued by OCPD on February 18, 1992. The guidance included information on the development of annual workplans, including funding targets for FY92; post-CCMP funding; and Action Plan Demonstration Projects.

3. Action: Send Regions an information package on NEP nominations. (Mark Curran)

   Response: The information package for new NEP nominations was distributed to the Regions on February 20, 1992. The package included the NEP Primer, section 320 of the Clean Water Act, copies of the Guidance on Governors Nominations to the NEP, and guidance on a streamlined NEP process.

4. Action: Identify potential changes to NEP workload model. (Mark Curran)

   Response: Discussions at the meeting in Santa Fe in February resulted in consensus that changes to the NEP workload model were not necessary. This decision may need to be revisited once new estuaries are selected, depending on their geographic location.

5. Action: Conduct conference call on NEP conflicts of interest. (Mark Curran)

   Response: Region 4 General Counsel has submitted a memorandum to Headquarters OGC asking for an opinion concerning conflict of interest in the NEP. The issue concerns parties participating on NEP committees who may also be candidates for funding under the NEP. Headquarters OGC has not responded yet.

6. Action: Draft a white paper, with Regional help, on leveraging resources for NEPs. (Mark Curran)

Response: Mark Curran is participating on the Operational Programs Support Subgroup, part of the Headquarters Watershed Protection Approach Team charged with identifying actions to be taken to promote and support watershed programs within EPA. As part of this Subgroup, Mark has proposed using an NEP CCMP as a "pilot" for developing commitments from the base programs to take action.

7. Action: Meet with Soil Conservation Service to discuss funding available for estuarine studies and future work together. (Mark Curran)

Response: We have not yet scheduled a meeting with SCS.

8. Action: Develop a questionnaire and send it to Regions to gather inputs for ocean dumping workload model to help support FY94 budget request. (John Lishman)

Response: Questionnaire prepared and circulated in draft. Final questionnaire to be distributed the week of 4/13.

9. Action: Investigate potential changes to the ocean dumping workload model. (John Lishman)

Response: Discussed workload model issues at Santa Fe Branch Chiefs meeting and at Ocean Dumping Coordinators meeting in April. Potential changes to model will be evaluated following inputs of Regional data to model.

10. Action: Allocate FY92 301(h) and 403(c) Regional program funds, evaluate possible changes to distribution formulas, and distribute the analysis to Regions for comment. (John Lishman)

Response: 403 and 301(h) program funds have been distributed to Regions.

11. Action: Prepare paper on relationship between the 403 and 402 programs. (John Lishman)

Response: Have discussed need for guidance on interface of 402 and 403 programs with OWEC staff. Will initiate work to issue joint guidance memo on this subject from OWOW/OWEC.

12. Action: Distribute another draft of 301(h) rules to Regions for review prior to workgroup closure. (John Lishman)

Response: DO data on Gloucester has been received and evaluated. Preparing another draft of regulations for circulation to Regions.

13. Action: Assess overall program information management (e.g., ODES and STORET), soliciting Regional input to identify key issues and problems. (Karen Klima)

Response: Developing problem statement and approach, which will be ready for Regional input in June.

14. Action: Work with Regions to ensure that technical assistance workshops are well focused. (Karen Klima)

Response: Seeking Regional input to scoping effort. More to come at the OWOW National Meeting in May.

15. Action: Conduct customized monitoring training programs for Regions. (Karen Klima)

Response: Training in Galveston scheduled in July, 1992; Long Island Sound being scheduled now; discussions on Albemarle-Pamlico are underway; discussions on Florida NEPs are underway, looking at late FY92/early FY93.

16. Action: Send Coastlines mailing list to Regions for updating and identify methods for Regions to submit articles for publication. (Karen Klima)

Response: Will be mailed out by the end of April. In the future, calls for articles from the Regions will be sent via fax.

17. Action: Monitor the development of EPA pollution prevention policies and resulting program interactions opportunities. (Karen Klima)

Response: Pollution prevention policy and latest newsletter will be provided at OWOW National Meeting in May.

18. Action: Distribute the current draft EPA-COE MOU to the Regions for review. (John Lishman)

Response: Draft MOU distributed.

19. Action: Clarify laboratory certification program authorities and roles and consider addressing them in the EPA-COE MOU. (John Lishman)

Response: Developing draft MOU with COE. Will discuss inclusion of lab certification issue in the MOU.

20. Action: Design the planned enforcement training program to satisfy EPA requirements for program-specific enforcement training. (John Lishman)

Response: Reviewed and commented on draft training manual to assure it focuses on, and meets, program-specific needs.

21. Action: Conduct further analysis and begin preparing guidance materials on capping polices. (John Lishman)

Response: Discussed capping issues at April Ocean Dumping Coordinators meeting. Agreed that joint guidance with COE will be developed.

22. Action: Send information on a general enforcement training course to Region IX. (John Lishman)

Response: Information sent.

23. Action: Evaluate the potential next steps in developing bioaccumulation guidance. (John Lishman)

Response: Discussed issue at Ocean Dumping Coordinators meeting in April. Will coordinate with NERL on guidance for dioxin.

24. Action: Distribute draft proposed ocean dumping regulations (without preamble) to Regions. (John Lishman)

Response: Draft regulations distributed in March and discussed at April Ocean Dumping Coordinators meeting.

25. Action: Begin developing guidance on the relation between the 404 and 103 programs by meeting with the 404 staff, identifying statutory and regulatory concerns, and conducting a conference call with Regions. (John Lishman)

Response: Discussed 404/103 interface with Wetlands Division staff. Also discussed issue with Regional ocean dumping coordinators at April meeting. Will contact Region I to see if further action is needed.

26. Action: Publish the Near Coastal Waters guidance and specify how NCW resources will be allocated to the Regions. (Mark Curran)

Response: Final NCW FY92 Funding Guidance was issued by OCPD in March 1992. The guidance included information on the development of NCW Regional Strategies and annual workplans, as well as a allocation formula for developing annual funding targets.

27. Action: Make the normal process of distributing documents from OCPD to the Regions to be as follows: fax copies of key draft documents for review and other important documents to (1) the Regional Division Director and (2) to the Section Chief or other person designated by the Region. (Craig Vogt)

Response: Fax numbers of Division Directors and Section Chiefs or other designated staff have been distributed to OCPD secretaries.

28. Action: Disseminate a revised list of OCPD-sponsored meetings and training. (Craig Vogt)

Response: List to be sent out by the end of April, 1992

29. Action: Distribute a package of information regarding the ability of OCPD to fund certain Regional training expenses. (Karen Klima)

Response: As discussed during the March conference call, there is no opportunity for using AC&C funds instead of S&E funds for travel of any kind. However, travel for training purposes can be paid for with S&E funds from an object class different from routine travel, giving relief to the travel ceiling.

30. Action: Prepare FY94 budget requests that are tied to the Narragansett mid-Atlantic Bight initiative and link dredged material programs to pollution prevention initiatives. (Craig Vogt)

Response: An FY94 budget initiative was prepared and submitted that addresses our ocean programs including ocean dumping, 403, 301(h), and marine debris. The focus was on ecological risk decision-making, but also included pollution prevention. (It was not tied to the mid-Atlantic Blight initiative)

31. Action: Examine rapid bioassessment development. (Karen Klima)

Response: Plans are underway to meet with Region III to discuss their concerns. Discussions with ORD and OST on how to define biological integrity in coasts will continue.

32. Action: Send copies of the Estuarine Health Guidance from the Gulf Program to Regions. (Karen Klima)

Response: Will be mailed out by the end of April.

31. Examine rapid bioassessment development. (Karen Klima)

32. Send copies of the Estuarine Health Guidance from the Gulf Program to Regions. (Karen Klima)

REGIONAL ACTION ITEMS

1. Assist OCPD in providing information to support the development of the FY 94 budget for NEPs.

2. Review draft #3 streamlined NEP guidance.

3. Assist in developing a draft white paper on leveraging resources for NEPs. (Mario Del Vicario)

4. Send to Region IV the Region I Counsel's opinion on conflicts of interest for NEP committee members who may seek NEP consulting contracts. (Gwen Ruta)

5. Meet with state SCS offices to discuss funding available for estuarine studies and provide feedback to OCPD.

6. Review draft questionnaire regarding ocean dumping activities and submit data required by final questionnaire.

7. Participate in NOAA natural resource damage assessment and remediation activities, including technical advisory committees.

8. Identify communities likely to apply or reapply for a §301(h) waiver.

9. Submit information on benefits of secondary treatment for Narragansett Bay to Karen Klima. (Gwen Ruta)

10. Send Karen Klima a copy of Region I NEP success stories. (Gwen Ruta)

11. Inform OCPD of the effectiveness of civil penalties in enforcing OCPD programs. (Charles App)

12. Send a copy of the EPA administrative order regarding program-specific training requirements to OCPD. (Loretta Barsamian)

13. Keep OCPD informed of communications with OST regarding the Green Book, Gold Book, sediments quality criteria, and sediments strategy by sending copies of comments to Dave Redford.

14. Review draft Management Strategy regarding capping and submit comments to OCPD.

15. Send schedules for developing Regional testing manuals to OCPD.

16. Identify the fax numbers for (1) Division Director and (2) Section Chief or other individual designated to receive key draft documents for revie and other important documents.

17. Review revised list of OCPD meetings and training, and indicate ranked priorities and likely participants (numbers and names, if available).

18. Assume that OCPD Regional Reviews will not duplicate OWOW reviews.

19. Send Estuarine Health Guidance to Karen Klima. (Fredrick Kopfler)

TUESDAY, FEBRUARY 4, 1992

OCPD Programs: Updates, Status, Issues, and Priorities

Marian Mlay described the substantial progress made by OCPD since the meeting in Charlottesville last year. She noted that:

- OWOW is now operating as a team.
- OCPD has completed its reorganization; is recruiting for new section chiefs; plans to be fully staffed in the next few months; and has completed its FY 92 agenda.
- The following major policy issues have been resolved: new NEPs, post-CCMP funding, and NCW guidance. In addition, the Urban Institute has begun its evaluation of the NEP program and OCPD has streamlined the financial process for APDPs, §301(h), and §403(c).
- The major issues facing OCPD include funding for the ocean dumping, §301(h) and §403(c) programs, allocation of Anderson time and costs, and the overall FY 94 budget development.
- OCPD will continue to develop team work and cooperation among the Coastal Zone, NEP-NCW, and non-point source programs.
- OCPD faces a challenge in meeting the needs of its customers through technology application and transfer, and plans to increase its outreach activities after hiring new staff in that area.
- Regional-HQ communications have improved, but we are working to improve it further.

Regional Programs: Updates, Status, Issues, and Priorities

Regional representatives identified the following key concerns:

- NEP implementation
- The relationship between the §103 and §404 programs
- Leveraging other programs to help NEP implementation
- Management of contaminated dredged material
- Capping policy and dealing with the Army COE

Guidance under Development for the MPRSA Section 103 Dredged Material Ocean Dumping Program

Dredged Material Permit Review Guidance

- Intended to assist EPA Regional Personnel when Reviewing Corps of Engineer dredged material ocean dumping permits
- Significantly revised from draft reviewed by regions in the Fall 1990
- Distributed to regions at Ocean Dumping Coordinators meeting on the week of April 6th
- Comments due by May 18th
- Final by end of FY

Framework for Evaluating Disposal Alternatives (Phase I)

- Describes the characteristics of a range of disposal options and what should be considered when determining the environmental acceptability of an alternative
- Prepared jointly by EPA and the COE
- Reviewed by regions in the Fall of 1991
- Final by end of FY

Disposal Alternative Selection Guidance (Phase II)

- Describe how the COE makes a disposal site selection decision, especially in regard to beneficial use decisions
- Will provide EPA with the information to work within the COE system to promote more beneficial uses
- Will be prepared jointly by EPA and the COE
- Will begin work in June 1992

Site Designation, Management and Monitoring Guidance

- Describes policies, roles and responsibilities and procedures for designating, managing and monitoring ocean disposal sites for dredged material
- Prepared jointly by EPA and COE
- Draft reviewed by regions in spring of 1991
- Significant revisions have been made; revisions were reviewed by HQs; additional revisions are necessary before another field review to shorten and eliminate redundancies
- Next field review expected in June 1992

Capping Guidance

- Describe site characteristics, material (both dredged and cap material) characteristics, and monitoring requirements necessary for successful capping operations
- Will be prepared jointly by EPA and COE
- Will begin in May 1992

Dioxin Guidance

- Describe methods for evaluating sediments suspected of contamination with Dioxin
- Will be prepared jointly by EPA and COE
- Will begin in June 1992

Dredged Material Reference Document

- Provides an annotated bibliography of dredged material related documents
- Documents therein considered "essential" (based on interviews with regions) will be provided to regions
- Draft reviewed by regions in the Fall of 1990
- Camera-ready final is in preparation
- Final distributed in July 1992

Fish Waste and Asbestos Guidance

- On hold due to workload on regulations and other major guidance documents
- Fish waste guidance needs OWEC review
- Both documents were reviewed by regions in the Fall of 1990

DREDGED MATERIAL SITE REG ISSUES

Scope

1. ODBA

- O NWF lawsuit says we must explain why we treat dredged material differently -- ODBA can help with our rationale since it essentially precludes by statute the dumping of non-dredged material.

  - ▸ Revised regs will codify, without amplification, ODBA statutory provisions and use as a rationale as to why we are focussing on dredged material and not making the same changes for non-dredged material.

2. MPRSA Amendments

- O Since MPRSA has been amended (tightened up) since the 1977 regs with regard to emergency permits, LLRW, and med waste; if these changes are left out of regs we may get adverse comments from environmental groups.

  - ▸ Revised regs will codify, without amplification, the statutory amendments.

3. Sediment Quality Criteria

- O Sediment Quality Criteria (SQC) are scheduled to be proposed for 5 compounds sometime this year. The current regulations do not address the use of SQC.

- ▸ Revised regs will include a discussion of SQC and their potential application in the preamble. Would not revise regulations to include SQC at this time.

Policy

4. Dredged Material Permit Review

- O The Corps, as lead agency for permitting dredged material disposal, will develop and issue section 103 permits. EPA, as lead agency for enforcing against violations of MPRSA through assessing administrative penalties or making criminal referrals, will review Section 103 permit language for enforceability.

  - ▸ EPA and Corps headquarters will develop model boilerplate permit language for use by Regions and Districts in

standard-issue permits. Regions and Districts can modify or add to model.

- If project or site conditions are such that special permit conditions are required to comply with MPRSA, EPA and the Corps will agree to additional permit conditions and EPA will review the draft permit.

5. Site Management Roles

O The purpose of site management is to confirm that disposal is occurring in compliance with permit terms and to ensure the ongoing environmental integrity of the site and surrounding areas.

- Management of a site consists of:

(1) Regulating times, rates, and methods of disposal, and quantities and types of materials disposed of, through site restrictions and issuance or modifications of permits.

(2) Developing and implementing effective environmental monitoring programs for the site;

(3) Initiating enforcement actions for violations of the Act and regulations developed under it;

(4) Modifying permits and site designations as necessary to ensure environmentally sound disposal practices;

- EPA has primary responsibility for site designation. The Corps has primary responsibility for permit issuance. EPA and the Corps share responsibility for environmental impact assessment and compliance monitoring. The revised regs will reflect the division of responsibility.

6. Voluntary EIS Policy

O Under the National Environmental Policy Act (NEPA) federal agencies are required to assess the environmental impacts of their decisions. EPA maintains a voluntary policy of preparing Environmental Impact Statements (EIS) for all ocean disposal site designations, regardless of size or duration.

O **In the past we have sought review of this voluntary policy and recommended that it be reconsidered. The recommendation was not approved.**

- We may again approach the Administrator and recommend that the strict requirement of an EIS for <u>every</u> site be reconsidered. EIS's would still be conducted for certain

sites (e.g. large projects, environmentally sensitive areas), but for others (e.g. single episode) we would conduct a lower level effort such as a FONSI.

7. Revise Exclusionary Criteria

- O The current regulations have criteria [at 40 CFR 227.13(b)] by which dredged material can be exempted from effects-based testing. These criteria (known as the exclusionary criteria) kick in if the material to be dredged is "predominantly" composed of sand, gravel, rock, shell, etc., and is found in areas of high wave energy, or is suitable for beach nourishment, or is far removed from sources of pollution.

- O Because these exclusionary criteria are somewhat vague there is the potential for abuse.

  - ▸ If supporting data is available, consider deleting the "predominately sand" and the beach nourishment exclusion. The "far removed" exclusion would remain.

8. Waiver Criteria

- O Existing regs repeat statutory criteria without elaboration; due to possibility of there being waiver request in future due to revised testing procedures, more guidance on waivers may be necessary -- issue has been sensitive with COE in past.

- O Question is what basic approach to criteria: (1) absolute environmental criteria based on OD impacts; (2) relative environmental criteria based on impacts of OD vs. land-based alts; (3) Relative criteria considering benefits of dredging project (including economics) vs. impacts of dumping.

  - ▸ Revised regs will adopt approach based on absolute environmental criteria based on OD impacts, subject to showing there is reasonable basis for COE's assertion alternative disposal methods are unavailable.

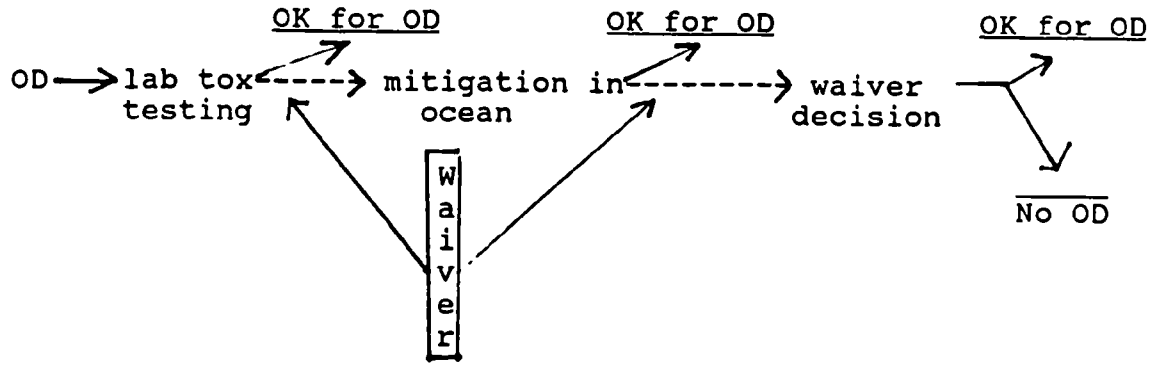
- O Note direct linkage to issue (9) -- if approach on issue 9 changes, will have to revisit this.

9. Relation of Waivers and Mitigation

- O Due to changes in testing procedures, it is more conceivable that some dredged material might fail criteria.

- O Existing regs do not address issue of whether ocean dumping

criteria can be met by mitigation (e.g., capping) or whether a waiver is required, with mitigation being relevant to issue of whether a waiver is approved:



Issue: Where to put the waiver bar in this process?

- Revised regs will allow the use of mitigation to meet the ocean dumping criteria without going through waiver.

10. Need

O MPRSA §103 provides that COE is to make an independent determination of need to ocean dump based on certain specific factors laid out in §103.

- Existing regs "need" criteria do not reflect this or offer guidance specific to dredged material alternatives.

- Revised regs will rewrite "need" criteria for dredged material to require COE to consider alternatives but do not dictate how the weighing of alternatives is to be done.

Technical

11. Initial Mixing -- time duration

O Existing reg uses a 4 hr mixing zone, a number which is not based on scientific knowledge and which is suspect; info to set a new number does not exist.

- Approach would be to revise mixing zone, probably to one hour, based on ADDAMS model or Gold book.

12. Bioassay Species Selection

O Existing regs require bioassay testing but is silent on what types of species to be tested.

- Revised regs would name specific species required to be tested (e.g. amphipod, mysid).

13. Clarifications to the LPC

- O Existing regulations use term "Limiting Permissible Concentration" (LPC) which requires consideration of WQC, water-column toxicity, benthic toxicity, and benthic bioaccumulation conditions when making a decision on the suitability of dredged material for ocean disposal.

- Revised regs removes term "LPC" and simply refers to each of the four conditions separately as criteria.

14. Water-Column Testing

- O Existing regs require water column bioassay testing with an initial mixing dilution factor. No dredged material has ever been known to fail the water column tests after allowance for initial mixing. The utility of requiring the test is debatable.

- Revised regs may fashion some type of exclusion which would require water-column testing only in those cases where dumping is frequent or continuous.

Draft Section of EPA/Corps Ocean Dumping MOU on

ENFORCEMENT

I. PURPOSE AND SCOPE

The United States Environmental Protection Agency (EPA) and the United States Department of the Army (Army) hereby establish policy and procedures pursuant to which they will undertake federal enforcement of the dredged material ocean dumping requirements ("Section 103 program") of the Marine Protection, Research and Sanctuaries Act (MPRSA). The EPA and the U.S. Army Corps of Engineers (Corps) have enforcement-related authorities under Sections 105 and 107 of the MPRSA and other statutes. For purposes of effective administration of these statutory authorities, this Memorandum of Understanding (MOU) sets forth an appropriate allocation of enforcement responsibilities between EPA and the Corps. The prime goal of the MOU is to strengthen the Section 103 enforcement program by using the expertise, resources, statutory authorities, and initiative of both agencies in a manner which is predictable, effective and efficient in achieving the goals of the MPRSA.

II. POLICY

A. General. It shall be the policy of the EPA and Army to maintain the integrity of the Section 103 program through federal enforcement. The basic premise of this effort is to establish a framework for predictable, effective and efficient permit processing, permit compliance monitoring and enforcement.

B. Review of Permit[1] Conditions for Enforceability. Section 103 related permit conditions must be enforceable in order to adequately control disposal activities and deter and penalize violations of the MPRSA. The Corps, as lead agency for permitting dredged material ocean disposal, will develop Section 103 related permit conditions. EPA, as the lead agency when seeking civil administrative or criminal penalties for violations of the MPRSA, will have review and approval authority over all Section 103 related permit conditions.

C. Violation Determinations. A violation, for the purposes of this MOU, consists of non-compliance with Section 103 related permit conditions, with disposal site restrictions promulgated under 40 C.F.R. 228, with regulations promulgated pursuant to MRPSA, and failure to meet the requirements of the MPRSA. Violations may be found by permittee self-reporting, review of compliance monitoring information, inspections or information received from the public or other federal, state or local agencies. When either the Corps or EPA determine that a violation has occurred, that agency will advise the other agency and initiate interagency discussions to determine the lead agency and appropriate enforcement actions to be pursued.

D. Lead Enforcement Agency. The lead enforcement agency will be selected by applying the factors contained in Section III.F of this MOU. The other agency will cooperate with the lead agency when agreement has been reached on the need to pursue an enforcement action. The lead enforcement agency will complete the enforcement action once the nature of the violation has been determined and lead agency has been agreed upon. A lead enforcement agency decision with regard to any issue in a

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[1]As used in this MOU, the term "permit" is used to refer to both an actual permit for private projects and the MPRSA Section 103(e) equivalent for Federal Projects.

particular case, including conduct of an investigation or disposition of the enforcement action, is final for that case.

E. Enforcement of Unpermitted Dredged Material Dumping. EPA will be the lead enforcement agency for unpermitted ocean dumping of dredged material. When EPA becomes aware of any unpermitted ocean dumping of dredged material, it will notify the Corps so an enforcement action, as warranted, under Section 10 of the R&HA may also be pursued.

III. PROCEDURES

A. Standardized Permit Conditions. EPA and the Corps will agree upon standardized permit conditions, which will be written such that they are legally enforceable. Standardized permit conditions will be agreed and used in all permits to which they are applicable. EPA and the Corps will periodically review the standardized permit conditions for workability and effectiveness based on program experience. Standard permit conditions shall be developed to address compliance with:

1. the type of material authorized to be transported to be dumped or to be dumped;

2. the amount of material to be transported to be dumped or to be dumped;

3. the location where such transport for dumping will be terminated or where such dumping will occur;

4. the locations from which the dredged material may be excavated including all horizontal and vertical boundaries;

5. all restrictions on the use of the disposal site, which

are promulgated under 40 C.F.R. 228;

6. any necessary restrictions to bring the project into compliance with the Ocean Dumping Criteria (40 C.F.R. 220-228), e.g., limits on times or rates of disposal;

7. self reporting requirements and independent inspections procedures; and,

8. such other matters the EPA and the Corps deem appropriate, e.g., distribution of liability (i.e., joint and separable vs. individual).

B. Approval of Alternate Permit Conditions. When a project contains a feature such that additional permit conditions are necessary to assure compliance with the Ocean Dumping Criteria (40 C.F.R. 220-228), additional or alternate permit conditions will be included in the permit. Such additional or alternate permit conditions will be approved by EPA and the Corps before a final permit containing such conditions is issued. If, in the course of developing a public notice for a project, the Corps determines that additional or alternate permit conditions are warranted, it will so notify EPA and initiate consultations for the approval of such conditions. If, during the review of a project for compliance with the Criteria, EPA determines that additional or alternate permit conditions are required, it will so notify the Corps and initiate consultations for the approval of such conditions. If the EPA and Corps can not agree on the need for, or language of, permit conditions, then the resolution of such disagreement shall be sought through elevation to EPA and Corps headquarters.

C. Compliance Monitoring. Compliance monitoring will be undertaken to ensure conformance with permit conditions. Compliance monitoring requirements to be undertaken by the permittee will be stipulated as permit conditions and will

generally take the form of:

1. Self Reporting. All permittees will be required to notify the EPA and Corps within 24 hours of any permit condition violation. The exact method of notification and any other immediate actions to be undertaken by the permittee will be incorporated into the specific permit condition. The EPA and Corps will proceed with enforcing reported violations in accordance with Sections (D), (E), (F) and (G) below.

2. Project Inspection Reports. In addition to self reporting, independent (i.e., not from the actual dredging and dumping parties) inspections will be conducted for all dredging and disposal activities under Section 103 of the MPRSA. The exact methods used to conduct such independent inspections and the format and content of any inspection reports or certifications will be incorporated into the specific permit condition. Copies of inspection reports will be made available to EPA and the Corps for review and determination of the existence of violations. The EPA and Corps will proceed with enforcing violations in accordance with Sections (D), (E), (F) and (G) below.

D. Interagency Consultation on Potential Violations. When either EPA or the Corps determine that a violation has occurred, that agency will advise the other agency and initiate interagency discussions to determine the lead agency and appropriate enforcement actions to be pursued.

E. Lead Enforcement Agency Selection (Case-load Allocation). Depending on the type of violation (e.g. Section 103 only or Section 103 and Section 10) and the type of disposal authorization (i.e., permit or Federal project), each agency has a range of enforcement tools available. The lead enforcement agency will be selected so the penalty will match the violation in severity and

will be sought in the most efficient and effective fashion given the agency resources and work loads. The lead enforcement agency will be selected using the following guidelines:

1. EPA will act as lead enforcement agency when a permit violation involves the following (weighted in the order presented):

   a. Violations of the Ocean Dumping Criteria which:
      - result in environmental harm at the disposal site or its surroundings; or,
      - impair the integrity of the criteria.

2. The Corps will act as lead enforcement agency when a permit violation involves the following (weighted in the order presented):

   a. A breach of contract which is either not an MPRSA violation or is an MPRSA violation but is more appropriately dealt with in a contract action; or,

   b. Violations of the River & Harbors Act.

3. As lead enforcement authorities under the above-stated conditions, EPA and the Corps have a "right of first refusal," i.e., the lead agency may decide not to pursue an enforcement action under their applicable authority. When this occurs, the other agency can make an independent determination to pursue enforcement through procedures available to it. When it is urgent or unclear as to the nature and extent of the violation, the agency shall pursue any appropriate enforcement actions and within a reasonable time period notify the other agency of the potential violation and the enforcement actions

taken.

F. Pursuit of Enforcement Action. After the lead enforcement agency has been selected, the other agency will cooperate with the lead agency. The lead enforcement agency will complete the enforcement action once the violation and lead agency are determined. The lead enforcement agency shall determine, based on its authority, the appropriate enforcement response taking into consideration any views provided by the other agency. An appropriate enforcement response may included an breach of contract action, administrative order, administrative penalty complaint, a civil or criminal judicial referral or other appropriate formal enforcement response. The lead enforcement agency will conduct all investigations and prepare all enforcement related materials it determines are necessary. A lead enforcement agency decisions with regard to any issue in a particular case is final for that case.

G. Resolution. The lead enforcement agency shall make a final determination that a violation is resolved and notify interested parties so that concurrent enforcement files with another agency can be closed. In addition, the lead enforcement agency shall make arrangement for proper monitoring when required for any remedy/removal, compensatory mitigation or other corrective measures.

IV. RELATED MATTERS

A. Interagency Agreements. The EPA and Army are encouraged to enter into interagency agreements with other federal, state, tribal and local agencies which will provide assistance to the EPA and Corps in pursuit of Section 103 enforcement activities. However, only the Corps or EPA (or the US Coast Guard) may make a violation determination and/or pursue an appropriate enforcement response based upon information received from a third party.

B. EPA/Corps Field Agreements. EPA Regional offices and their respective Corps Division or Districts shall enter into field level agreements to more specifically implement the provisions of this MOU.

C. Data Information Exchange. Data which would enhance either agency's enforcement efforts should be exchanged between the EPA and Corps where available. At a minimum, each agency shall begin to develop a computerized data list of persons that have been subject to a Section 103 enforcement action subsequent to October 23, 1972 (enactment date of the MPRSA) in order to provide historical compliance data on persons found to have illegally dumped into the ocean. Such information will help in an administrative penalty action to evaluate the statutory factor concerning history of a violator and will help to determine whether pursuit of a criminal action is appropriate.

D. National Guidance. EPA and Corps headquarters shall jointly develop and issue guidance for developing standard permit conditions. Guidance may include draft "boilerplate" permit conditions, factors which facilitate enforceability of permit conditions, and the applicability of various tools and techniques which could be included in permit conditions for measuring compliance.

V. GENERAL

A. The procedures and responsibilities of each agency specified in this MOU may be delegated to subordinates consistent with established agency procedures.

B. The policy and procedures contained within this MOU do not create any rights, either substantive or procedural, enforceable by any party regarding an enforcement action brought

by either agency or by the U.S. Deviation or variance from these MOU procedures will not constitute a defense for violators or others concerned with any Section 103 enforcement action.

C. Nothing in this document is intended to diminish, modify or otherwise affect statutory or regulatory authorities of either agency. All formal guidance interpreting this MOU shall be issued jointly.

D. This agreement shall take effect 60 days after the date of the last signature below and will continue in effect for five years unless extended, modified or revoked by agreement of both parties, or revoked by either party alone upon six months written notice, prior to that time.

PROPOSED USE OF SQC IN DREDGED MATERIAL REGULATORY PROGRAM

Background

* Current regulations under Section 404 of the Clean Water Act (CWA, discharge of dredged and fill material to waters of US) and Section 103 of the Marine Protection, Resources, and Sanctuaries Act (MPRSA, ocean dumping) require testing of dredged material prior to disposal in the aquatic environment. At present dredged material discharged under CWA 404 is not evaluated under a formal testing manual. For ocean dumping, the Agency does have a testing manual developed in conjunction with the Corps (the Green Book), which was revised and updated in February 1991. Of the approximately 200 million cubic yards of dredged material disposed of annually in the aquatic environment, approximately 60 million cubic yards is ocean dumped subject to the MPRSA, with the remaining 140 million cubic yards going to waters subject to CWA 404 or to upland sites.

* Testing is only one element of the overall permit decisionmaking process. Before aquatic disposal can be allowed, all other requirements of the CWA 404 Guidelines or MPRSA ocean dumping regulations must be satisfied. SQC would be used in addition to, as opposed to replacing, existing regulatory requirements.

* Under CWA Section 404(b)(1) and MPRSA Section 102(a), EPA has the primary role, in consultation with the Corps, for developing the environmental regulations by which permit applications must be evaluated.

Use of SQC in the dredged material regulatory program

TESTING MANUALS AND REGULATIONS

* SQC are numerical values representing the concentration of chemicals in sediment that are determined to adversely affect benthic organisms. The preferred approach is to include use of Sediment Quality Criteria (SQC) in the testing and evaluation portions of the regulations (CWA 404: 40 CFR 230.61; MPRSA: 40 CFR 227.6(c) and 227.13(c)) and in the relevant testing manuals.

* The preferred way to implement SQC would be to employ a reference area approach. Under this approach, dredged material which meets the SQC (i.e., dredged material which does not exceed the numeric concentrations) would satisfy the chemical portions of the testing provisions for those chemicals with SQC values. Dredged material which does not meet the SQC would be evaluated using the SQC methodology to calculate the bioavailable fraction of the chemical in both the reference area sediment and the dredged material. If the dredged material bioavailable chemical concentration is less than or equal to the reference area concentration, the chemical-specific portions of the testing provisions for those chemicals with SQC values would be

satisfied. If the dredged material bioavailable chemical concentration exceeded the reference area concentration, the dredged material would fail the chemical-specific portions of the testing provisions. It is important to note that further clarification is needed to determine exact "pass/fail" points, because of the uncertainty inherent in each SQC value.

* The reference area approach was chosen in part because it retains the reference area approach which has been used in the ocean dumping program for many years, thus maintaining an element of continuity in the management of dredged material. In addition, use of a reference area as the benchmark for determining the acceptability of the material to be disposed is consistent with the MPRSA's use of the "unreasonable degradation" standard for permit issuance.

* Because the Agency's goal is to provide for consistent environmental protection between the CWA 404 and MPRSA programs, where and how SQC are applied by the regulations and testing manuals will likely be similar in both programs.

* Under current Section 404 program procedures, the chemical-specific testing requirements apply only to material for which there is a reason to believe that it may be contaminated. In the case of MPRSA, dredged material which meets certain criteria showing contamination is unlikely (40 CFR 227.13(b)) is excluded from testing. It is envisioned that these testing exclusions would be retained.

STATE STANDARDS

* For CWA 404, the States may incorporate SQC into their Water Quality Standards, and thus implement them through their Section 401 certification authority. In such cases, SQC could apply to <u>all</u> Section 404 permit decisions, including discharges of dredged <u>and fill</u> material, regardless of evidence of contamination. Therefore, if SQC are implemented outside the testing regimes (i.e., in State water quality standards), the implementation manual being prepared for SQC should clearly acknowledge that SQC are not applicable to non-sediment **fill** activities (i.e., discharges of material that has an upland, non-sediment source such as quarries or borrow pits).

* For MPRSA, potential application of SQC via the State standards process is less of an issue. Many of the ocean dumping sites lie beyond the three mile limit, and thus are beyond the geographic reach of State standards. In addition, the applicability of the 401 certification process to ocean dumping also is less clear than in the CWA 404 program because MPRSA section 106 contains language pre-empting State regulation of ocean dumping and voiding licences or permits purporting to regulate ocean dumping.

Other options considered

A) Use SQC as a flat pass/fail criteria. This option was rejected because the use of an absolute numerical value would be inconsistent with the testing provisions of the 404 Guidelines and the reference area approach of the ocean dumping program. Chemicals for which SQC are and will be available constitute only a portion of possible contaminants, and chemical testing is only one portion of the overall effects-based testing regime. In addition, this option is likely to draw the strongest opposition from the Corps and regulated community.

B) Provide for a bioassay test over-ride of SQC. The SQC reflect chronic effects, whereas the currently available sediment bioassay methods reflect acute effects. Until chronic bioassay methods become available, it would be difficult to justify an approach of using sediment bioassay results to "override" SQC in the testing program. The option of a bioassay test override would be the most acceptable to the Corps and regulated community from the point of view of minimizing what they perceive as unnecessary economic and programmatic impacts associated with SQC.

Implementation steps (timeline also attached)

IMPLEMENTATION STEPS COMMON TO CWA 404 AND MPRSA

1) Evaluate available data to better assess programmatic impacts of SQC. **TIMING: Initiate immediately**

2) Review SQC documentation in light of Corps comments. **TIMING: Initiate immediately**

3) Address use of SQC in dredged material regulatory programs in SQC implementation guidance. **TIMING: Coincide with planned release of SQC implementation guidance**

4) Track and comment on potential legislation regarding use of SQC in regulatory programs. **TIMING: Dependent on Hill legislative action**

5) Negotiate with Corps on use of SQC in dredged material programs. **TIMING: Initiate immediately**

6) Upon finalization of SQC, amend regulations to incorporate their use as described in the preferred option. **TIMING: Propose regulatory revisions within 6 months of SQC finalization**

7) Revise testing manuals to address SQC implementation. **TIMING: Issue draft at same time as regulation proposal**

TWO ADDITIONAL IMPLEMENTATION STEPS FOR MPRSA

* Proceed with current plans to revise dredged material dumping regulations. The existing ocean dumping regulations for dredged material are being revised to respond to the results of a past lawsuit and incorporate program experience. These revisions would move ahead without awaiting resolution of the SQC issue, and the preamble can be drafted to solicit early public comment on how to use SQC in the program, thus serving much like an ANPRM on the issue.
TIMING: Proposal Fall/Winter '92

* Avoid actions within London Dumping Convention (LDC) that limit or impair US flexibility on issue of SQC usage. Under §102 of the MPRSA, EPA is obligated to apply the binding requirements of the LDC in developing its ocean dumping regulations. In order to avoid surrendering control on the SQC issue to an international (and often political body), the US should seek to avoid interjecting the issue of SQC into the LDC until such time as the SQC are finalized and the position on their use in the dredged material program is firmly developed.
TIMING: LDC meetings over next 2 - 4 years

OUTCOME MONITORING FOR ESTUARY MANAGERS: TRACKING ESTUARY PROTECTION PROGRAMS

Of the 100 estuaries in the nation's coastal areas, 17 have been included in the National Estuary Program. This program provides special attention to focusing the efforts of all levels of government, along with involvement of business and the environmental community, in remediating past problems and preventing future damage to each estuary. This is accomplished through the installation of a Management Conference, which develops a Comprehensive Conservation and Management Plan (CCMP). The plan outlines activities and their estimated costs, and presents a timetable for implementation of actions by dozens of agencies and organizations.

The Urban Institute is assisting the participants to develop a monitoring system to use for tracking the progress being made in protecting these estuaries. While primarily aimed at tracking implementation of actions recommended by the Management Conference in the CCMP for each estuary, the system will be helpful in the assessment of the National Estuary Program in its entirety. The monitoring system will accomplish three basic objectives. It will:

- *assist estuary program managers improve their programs by identifying current and emerging problems;*
- *provide accountability to elected officials and the public relating to the progress towards estuary protection;*
- *help identify the programs and projects that are working well; and*
- *provide a framework for assessing the National Estuary Program as a whole.*

Three estuaries will serve as pilots for the development of the monitoring system. The monitoring system will be developed and tested with these estuaries during 1992 and early 1993, and made available to all estuaries in late 1993.

A steering committee that includes representatives from all levels of government, industry, several estuaries, and the environmental community has been established to help guide the development and dissemination of the outcome monitoring project.

THE URBAN INSTITUTE

2100 M Street, N.W.

WASHINGTON, D.C.

MEMORANDUM

TO: Estuary Outcome Monitoring Steering Committee

FROM: Blaine Liner Blaine

DATE: April 20, 1992

SUBJECT: Material for April 20 meeting is enclosed

Enclosed you will find three short papers concerning monitoring outcomes--one is on system characteristics, one on performance indicators, and the other describing the field procedures. I hope you will be able to read through them prior to the meeting since they will be the focus of much of our discussion.

A Continental breakfast will be provided in Conference Room A of The Urban Institute beginning at 8:30 a.m. If you have questions about travel, hotels, or the agenda, don't hesitate to call us.

April 16, 1992

PERFORMANCE INDICATORS

A. Characteristics of Performance Indicators

The following characteristics need to be considered for each indicator when selecting performance indicators and designing an appropriate estuary protection outcome monitoring process:

1. **Type of indicator**, grouped by such categories as:

   - First Order Effects -- whether the indicator provides information as to the extent to which needed actions have been adequately implemented (administrative and regulatory actions).

   - Second Order Effects -- whether the indicator provides information as to the extent to which actions have led to a reduction in threats to water and sediment quality (such as reduced pollutant discharges/loadings).

   - Third Order Effects -- whether the indicator provides information as to the extent to which water or sediment quality has changed (concentration levels).

   - Fourth Order Effects -- whether the indicator provides information as to the extent to which health of humans, fish, other wildlife, habitat, and vegetation, and the economy of the region have changed (living resources; economic conditions).

   Examples of performance indicators for each of these four categories are presented in Section B, below.

2. **Frequency of measurement** -- how often is the particular measurement needed.

3. **Lag time of the measurement**--expected length of time from an NEP-related action until there is likely to be a detectable effect on the measured values of the indicator. This should be identified for each measure. Long intervals should not be the sole reason for exclusion of an indicator. In general, first and second order effects are likely to occur sooner than third and fourth order effects.

4. **Coverage/scope of the measurements** -- which particular fish or shellfish are covered

by the indicator.

5. **Geographical coverage of the measurements** -- how much, and which particular parts, of the estuary is covered. One factor here is the extent to which the estuary programs focus on particular problem locations whose progress needs to be tracked (in addition to monitoring the estuary as a whole). (Note: for some indicators, less mobile species will generally be needed for smaller geographical areas.)

6. **Timing of the measurements** -- in which seasons or months will the measurements be made. Temperature and precipitation conditions, for example, can have substantial effects on the values for some indicators, and these are usually closely related to time of the year.

7 **Units in which the indicator is expressed.** For example, some measurements are best expressed as averages, some as cumulative totals, and others as readings at specific points in time.

8. **Extent to which the measurement is believed to be affected by natural factors**, such as information on the extent to which the measurements can be expected to have a cyclical component (e.g., natural fluctuations in species populations).

9. **Accuracy and precision of the indicator measurements** -- how much uncertainty is there that the measurements for the indicator are sufficiently accurate and valid for their intended use.

10. **Availability of "standards" for the indicator** -- levels above, or below, which excessive risks are expected to occur. Whether or not standards exit, an NEP can set targets for each and every performance indicator that indicate what level of achievement is anticipated by particular points in time.

11. **Composite performance "index"** -- can, and should, the indicator be included as part of an index (e.g., an overall index of water quality) that would be useful to estuary officials.

12. **Breakouts of the indicator** that will provide officials with improved perspective as to what is happening and where. These might include such breakouts as:

- Sources of the problem (e.g., particular industries, government facilities, households, particular recreational activities, stormwater runoff).
- Particular pollutant/problem.
- Geographical sections of the estuary area.
- Which political jurisdiction (including federal, state and local units).
- Time of the year.
- Degree of hazard (e.g., counts of permit violations by whether major or minor violations).

Breakouts that are particularly important are candidates for inclusion in the basic performance reports; others might be included as backup tables to the reports.

13. **Explanatory information.** External factors can have important effects on observed progress. Thus, such explanatory information should be included as part of the regular performance reports to help put the progress information into proper perspective. For example, unusual amounts of precipitation or unusual temperatures can cause the occurrence of certain estuary problems and should be reported; similarly, degradation of habitat in spawning areas located outside the estuary can affect populations of migratory fish; and changes in estuary funding can have major effects on progress.

14. **Limitations of each performance indicator.** Each indicator should be clearly defined, both as to its scope and coverage (as noted above) and its limitations and weaknesses. This will help users of the information to put the information into proper perspective.

15. **Cost of data collection.** How much added time and cost swill be required to obtain the data at the frequency and precision needed.

B. Performance Indicators

Below are candidates for performance indicators that assess progress in estuary protection. These indicators are aimed at measuring the outcomes, that is, the results of estuary protection activities. Each estuary program will need to identify the specific indicators, and variations thereof, that best meet the estuary's own needs and are important to it.

First Order Effects: Implementation of external activities expected to lead subsequently to higher order effects such as reduction in environmental threats, improved water or sediment quality, and/or improved health or economic condition of living resources.

1. Number of local communities that have/have not passed and implemented estuary protection activities, such as: relevant land use legislation; recommended legislation to restrict particular chemicals; special discharge controls; requirements to follow best management practices; added enforcement activities; technical assistance to businesses to reduce hazardous waste production; public information activities. (Some of these indicators might be ad hoc ones relating to specific action projects.)

2. Amount of funds raised for estuary protection programs (as evidence of a substantial, continuing estuary protection effort).

3. Degree of satisfaction of state agencies, local government agencies, citizen/environmental groups, and business groups with (a) the progress being made; (b) the extent to which coordination, cooperativeness, and communications among the various involved groups have occurred (based on a systematic survey of agencies and groups).

4. Number and percent of estuary square miles that has been "monitored." (This has been a state 305b measurement.)

5. Number and percent of point source facilities reporting late, not reporting at all, or missing schedule dates for required facility changes/corrections, by type of facility (e.g. wastewater treatment, industrial, agricultural, federal, etc.)

6. Number and percent of facilities that are repeat violators of their permits, that is, are either (a) in substantial noncompliance for two or more consecutive reporting periods;

and (b) have been in substantial noncompliance more than once in, say, the past two years.

7. Elapsed time from identification of a serious noncompliance for either excessive discharges or not reporting on time until a public agency has taken a major enforcement action, whether an administrative action or judicial step.

8. Number and percent of various types of facilities not providing required information on time on their discharges, water quality samples, etc. -- by potential importance/seriousness category, categories based on such factors as the type and amount of pollutant potentially involved, and whether a repeat violator or not. (Note: EPA requires information on the number of "noncomplying" facilities, defined as including both those facilities that have not reported on-time and those whose discharges have exceeded permitted limits. These two major categories of noncompliance should probably be distinguished. The latter category is included as a second order effect since it directly relates to threats to water quality.)

9. Elapsed times from identification of serious discharge violations until the violations were corrected. This indicator might be presented in one or both of such forms as the following: (a) number and percent of facilities with one or more serious violations corrected, or still outstanding, after specific durations of time (such as six months, one year, etc.); and (b) the number and percent of violators still outstanding after "X" or more months. The average and median times from identification until correction, while of some interest, are not likely to be nearly as useful as providing information on the distribution of times, such as those that exceed some threshold length of time.

10. Number and percent of facilities that have exceeded their permitted amounts (such as maximum discharge limits) for one or more contaminants, categorized by seriousness. An additional variation is the number and percent of facilities with repeat violations over, say, the past 24 months.

11. Estimates of amount of use/sales of pesticides and fertilizers, by location (e.g. county), such as the tons of fertilizer applications, or the tons of nitrogen and phosphorus, broken out by source (e.g. agriculture, urban run- off, POTWs, industry perhaps by type, or "upstream" sources).

12. Amount of high-risk acreage added/reduced during the reporting period, through such

actions as land use and zoning provisions.

13. Response times to spills/emergencies.

14. Number of targeted facilities that have implemented BMPs.

15. Number of municipalities with/without storm water controls.

16. Percent of hazardous substances removed by area wastewater treatment plants.

17. Amount and percent of hazardous materials that are recycled.

18. Number and percent of businesses (industrial, commercial, and agricultural) and households that: (a) report having seen or heard program materials, and (b) rate the materials as useful.

<u>Second Order Effects</u>: Reductions in threats to water and sediment quality.

1. Amount of known pollutant discharges into waters, by substance and by type of source (e.g., wastewater treatment facilities, industrial facilities, power plants, commercial facilities, or federal facilities--perhaps further broken out into facility-size categories and type of industry, combined sewer outfalls, septic systems, recreational activities such as boating, agricultural, etc.). Each NEP is likely to want to highlight those pollutants that are a particular threat to the estuary. However, the estuary should track any substances that the program has identified as a potential threat, even though no current problem exists. In this latter case, pollutants might be measured at less frequent intervals, and with less detailed spatial coverage, than problem substances in order to avoid excessive measurement costs

   Tracking of discharges from point sources is federally required under NPDES quarterly (or monthly) discharge monitoring reports, though not all dischargers report.

   NOAA's periodic point source discharge reports have covered: biological oxygen demand (BOD), total suspended solids (TSS), nutrients (nitrogen and phosphorus), metals (arsenic, cadmium, chromium, copper, iron, lead, mercury, and zinc), petroleum hydrocarbons (oil and grease), pesticides (35 compounds), pathogens (fecal coliform bacteria), and wastewater treatment sludge.

2. Estimated amount of pesticides and fertilizers entering the estuary by location (e.g., county); for example, tons of nitrogen and phosphorus, broken out by source (e.g., agriculture, urban run-off, POTWs, industry perhaps by type, or "upstream" sources).

3. Amount of point source pollutants discharged in excess of permitted levels.

4. Amount of pollutant discharged in spills, by geographical area and type of pollutant.

5. Number and percent of businesses (industrial, commercial, and agricultural) and households that report having altered their behavior/production processes to reduce their pollutants by a significant amount.

<u>Third Order Effects</u>: Effects on water and sediment quality.

1. Indicators of water quality in various segments of the estuary, including extent to which standards are exceeded for specific pollutants, various physical characteristics are exceeded, etc. This should cover such characteristics as: dissolved oxygen (DO), total suspended solids (TSS), toxics (metals and chemicals), nutrients, pathogens (e.g. fecal coliform bacteria), clarity, extent of visible trash, etc.

   Summary indicators should be used, such as: (a) an overall water quality index (e.g., index being developed at Sarasota Bay), perhaps using a scale of "one" to "ten"; and (b) the amount of water acreage for which, say, one or more water quality characteristics significantly deviates from safe or desired levels.

2. Frequency, extent, and duration of restrictions on uses of the water, such as on shellfishing, finfishing, boating, bathing, and other commercial and recreational uses. For example, for shellfish NOAA tracks the amount and percent of acreage that is "harvest limited" (acreage that may be contaminated with bacterial or viral pathogens). This is further broken out by the amount that is "conditionally approved," "restricted," or "prohibited." It is also likely to be important to track the duration of these restrictions, such as tabulations of the number of acreage-days under restrictions.

   Another form of this indicator is the amount (e.g., acreage) downgraded/upgraded during the period in terms of designated uses.

3. Soil/sediment contamination levels.

4. Percent of estuary square miles that support designated uses: (a) fully; (b) partially; or (c) not at all. (This is an indicator that has been used in the state 305b reports.)

5. Percent of citizens and businesses that give various ratings (such as excellent, good, fair, or poor) to the estuary area on: usability for various recreational/commercial activities, appearance, smell, edibility of fin and shell fish coming from the estuary waters, etc.

<u>Fourth Order Effects</u>: Effects on health of living resources (whether human, fish, fowl, vegetation) and on economic conditions.

1. Counts of contaminated resources: (a) shellfish; (b) finfish; (c) water fowl; (d) mammals; (e) vegetation -- such as amount of contaminated fish, tissue contamination findings, prevalence of diseases in animals, number and size of fish kill events categorized by cause, and loss of species.

2. Size of harvest: amounts (e.g., pounds) of commercial catches (landings/harvests) of key fish and shellfish, numbers of juveniles in nursery areas during the summer that have grown to two inches since hatching in the spring (used by Chesapeake Bay), and average numbers caught in nets. (However, data on commercial catches are generally less valid than systematic samples because catches do not necessarily track the natural abundance of species. Other factors can have major effects on the size of catches, such as market values, fishing technology, and fishing time.)

3. Illegal harvesting: for example, (a) estimated amount of healthy fish harvested above legal levels, and (b) estimated amount of contaminated fish illegally harvested.

4. Amount (e.g., acreage) of wetlands and habitat available/lost.

5. Number of reported incidents of human disease/health problems due to water contamination problems -- by severity of incidents.

6. Economic value of various estuary-related commercial and recreational activities.

Summary indicators of conditions are likely to be highly desirable because of the large number of individual species and pollutants. Some national attempts to develop these are already on-going, such as various "coastal community bio-assessment indicators," based on such data as the number and type of species and weight ("biomass") of key animals -- relating to certain types of estuary conditions. However, each NEP should consider, while waiting for national versions, developing its own summary indicators (e.g. of water quality) based on local technical advice and its own set of estuary problems and conditions.

April 16, 1992

Outcome Assessment Procedures For Estuary Managers

Suggested System Characteristics

Purposes and Clients For Outcome Assessment

This process for monitoring the outcomes of estuary protection efforts has two primary purposes:

1. To provide basic, important information to estuary program officials/managers to help them plan and manage the program by providing feedback on the extent to which their activities are achieving the effects expected. This, in turn, should help guide and improve future program activities and aid in priority setting.
2. Provide information to elected officials and the public as to the extent of estuary protection progress being made, thereby increasing accountability for the resources being applied to the effort.

The procedures are focused on helping individual local estuary protection programs, their managers, and other public officials. The performance information can indicate where expected progress is not being made and, thus, direct attention to those problems. The information from subsequent reports can indicate whether actions taken to correct problems have led to the desired outcomes. And the performance information can be used to communicate with citizens and the media as to the progress being made and to help develop and justify budget requests.

The information generated is also intended to help federal and state officials in their accountability and program improvement tasks. For example, the federal government can use

the information provided by the individual NEPs to help prepare reports to Congress on the progress and achievements that have occurred. EPA can also aggregate the information to identify what performance areas have been weakest and need technical assistance or other help. Since each estuary program will likely have somewhat different performance indicators and measurement protocols, it is not expected that the quantitative values will be additive. Other forms of aggregation, however, can be used.)

The outcome assessments will track progress in meeting management targets relating to environmental and other objectives. The procedures are not aimed at tracking strictly internal activities, such as the holding of committee meetings or meeting CCMP milestones. The focus of the information sought by the procedures is on progress external to the inner workings of the NEP itself. The information from the process can be used to provide baseline information for programs that engage in strategic planning and for programs that incorporate a "total quality management (TQM)" framework.

The procedures should be useful to estuary officials both during the period leading up to final CCMP approval and after it has been prepared and approved. During the CCMP preparation period, estuary programs undertake numerous activities intended to help protect the estuary even though the CCMP has not been completed. For example, NEPs undertake various efforts to alert their citizens to estuary protection needs and actions, and each NEP undertakes various action plan demonstration projects. The information obtained from the procedures, when combined with other information such as linkages to specific estuary program actions and to explanatory information (discussed further below) will help officials identify the effectiveness of program activities. However, these outcome monitoring

procedures will not provide rigorous evidence on the extent to which the estuary protection program itself has caused the observed changes. The information obtained by these procedures, if combined with information from in-depth evaluations or policy analyses, can shed further light on the effectiveness of particular estuary activities.

These procedures will not provide estimates of the efficiency with which program resources are being used. However, when combined with other information (e.g., program costs) these procedures will support estimates of cost-effectiveness of the program activities.

These outcome assessment procedures are intended to provide public officials a regular, comprehensive, and comprehensible picture of the progress being made on the major elements of the estuary protection efforts.

Primary Characteristics of the Procedures

Following are the primary characteristics that guide development of the detailed procedures:

1. Information needs to be provided on a number of indicators of estuary protection performance. Estuary protection inherently involves multiple aspects; also, various non-government interest groups with somewhat differing goals will inevitably exist in any estuary program. Therefore, indicators to be tracked should cover a range of outcomes, from progress by government, business, and citizens in implementing problem-reduction activities to the eventual "end" outcomes of improvement in the health of living resources.

2. The outcome assessment process will be modeled on a common framework that includes:

   (a) Performance indicators;

   (b) Breakouts of performance indicators by key characteristics of concern to the local program;

   (c) Reporting formats;

   (d) Explanatory information; and

   (e) Data collection procedures.

   This common framework should not constrain local autonomy, but will permit useful national assessments across discrete estuary programs.

3. The performance indicators should be labeled and grouped by the type of effect desired:

   - First Order Effects: Whether the indicator provides information as to the extent to which needed actions have been adequately implemented (whether the action is administrative or regulatory).
   - Second Order Effects: Whether the indicator provides information as to the extent to which actions have led to a reduction in threat to water and sediment quality, such as reduced pollutant discharges.
   - Third Order Effects: Whether the indicator provides information as to the extent to which water or sediment quality has changed.
   - Fourth Order Effects: Whether the indicator provides information as to the extent to which the health of humans, fish, other wildlife, habitat, and vegetation, and the economy of the region have changed.

This categorization of performance indicators should help officials and the public sort out the outcomes as to their ultimate importance. The first and second order effects will generally be observable relatively soon after program activities; third and fourth order effects generally will occur later.

4. Each estuary program can adapt the process and procedures to its own local needs. Given the common framework, each local program will want to focus on indicators that show the extent of progress in addressing the particular problems and priorities of concern to its own estuary. And each needs to choose data collection procedures and protocols based on local needs and assessment resources. The primary principle for the local program is to use measurement and reporting procedures that provide reasonably valid and useful information for assessing estuary protection outcomes. The estuary program will need to continue to report on each indicator until the indicator becomes obsolete or until it clearly is no longer worth collecting and reporting.

5. The procedures should provide information to officials on a regular, scheduled timely basis. Preferably, outcome assessment reports should be provided at least quarterly, for example, to reflect seasonal considerations. (However, data on some performance indicators may need to be collected more frequently, while data on others are less frequently collected.)

6. The outcome reports should be addressed to program managers and policy officials (and eventually the public); these are not the technical reports needed for the scientific community. The performance reports should be clear and readable by a non-scientific, non-technical, audience. While this may seem obvious, this principle is all too often

neglected. This does not mean the indicators can not have technical content, but they should be presented in a way comprehensible to laypersons.

7. The performance indicators should be stable over time so that progress and trends can be identified. That is, a relatively fixed set of outcome indicators should be used. Of course, improvements in measurement will occur, and the appearance of new estuary problems may require additional indicators. The principle here is that the reported indicators should not be solely those that have shown major changes in a particular reporting period or that currently happen to be the program's focus of attention.

8. The number of performance indicators should be limited for manageability. Therefore, some outcome indicators will need to be composite measures, that is, indicators representing aggregations of two or more component indicators (for example, to provide an overall indicator of water quality). In such cases, information on each component indicator should be readily available to persons that need more detail. Even if there is not completely satisfying scientific knowledge about an outcome characteristic and how to summarize it, usually at least a roughly reasonable summarization can be made. Tracking the values of such summary indicators can give policy officials and the public an improved understanding of key outcome characteristics.

9. To make the information more useful, selected outcome indicators should be broken out by key characteristics that are expected to be of importance to program officials/managers. Such breakouts, for example, are likely to include geographical characteristics (e.g., political boundaries) type of facility/industry involved, source of impairment, type of recreational activity, etc.

10. The indicators should cover outcomes that the estuary protection program has the potential to affect. However, it is not necessary that the programs have the primary influence over each outcome indicator's value. Thus, where an outcome is important to the estuary, but external factors play the major role in determining its value, the estuary program is still likely to want to track the outcome.

11. The performance indicators include both: (a) outcomes that can be expected to occur soon (e.g., within months) after a protection activity is implemented and (b) outcomes for which NEP activities can not be expected to yield results for, perhaps, many years. The performance reports should make it clear which indicators are not expected to show improvement for some years to come despite program activities. Similarly, those indicators whose values are likely to have resulted from actions taken years before should be identified as such.

12. The performance indicators generally will be expressed in objective units of measurement. However, subjective information may be needed for some indicators, such as those that describe the progress by units of government in implementing proposed environmental protection regulations. When subjective data are used, the information procedures, however, need to pass the test of having used a systematic, reliable, and documented procedures to obtain the information--so that users can have confidence that the subjective information is reasonably accurate.

13. To the extent practical, the performance indicators should also enable program officials to track progress on major special projects/activities, such as individual demonstration action projects. To do this will likely require breakouts of relevant performance

indicators that relate to the project, such as breakouts that focus on the specific geographical areas and pollutants targeted by the project.

14. The process includes provision for estuary program personnel to provide relevant explanatory information, along with the performance data in each performance report. Many external and internal factors can affect (adversely or beneficially) the outcomes of the program. For example, natural elements can have major effects on some outcome values. Explanatory information might be standardized data (e.g., population changes, amount of precipitation, and temperature data); or, it might be ad hoc (e.g., major businesses entering or leaving the area, other changes in pollutant loadings from areas around tributaries, or the appearance of a new fish disease believed not to have been caused by human activity).

15. Estuary programs are likely to want to set annual targets for the desired values of each performance indicator. The program will be able to track both the absolute progress and progress relative to the targets at the end of each reporting period. Selecting the targets for outcome indicators is a separate step from selecting the outcome indicators to track (and preferably would be part of an annual action plan). The targets should be set only after considering the resources that the estuary program expects to apply to affecting the indicator, as well as external factors likely to aid or hinder progress.

16. The annual cost of the outcome assessment process should be as low as possible without compromising its validity.

17. Perfect measurement is not possible. Many measurement problems exist and will continue to exist. The performance reports should clearly note those outcome indicators

for which considerable uncertainty exists as to the accuracy and validity of the measured values. The principle used here is that the procedures should be the best currently available to the program within its budget. The procedures should make as much use as possible of the latest scientific and technical knowledge, and should be sufficiently precise to help program officials make decisions that help them improve the program. Standardized data collection protocols should be used within the estuary to the extent feasible. However, the desire for perfection and scientific proof should not deter the use of outcome indicators and data collection procedures that do not meet rigorous standards. It is better to be roughly right than to do nothing.

18. The management outcome monitoring process should make use of data provided by the estuary's existing environmental ("scientific") monitoring process to the extent practical and appropriate. The environmental monitoring data will be the basis for most third order and fourth order performance indicators. For the management reports, the highly detailed, and often highly technical, environmental data will need to be summarized (probably, in some cases, into "indices").

18. The management outcome monitoring process should help form the basis for the estuary program's monitoring plan, which preferably encompasses both environmental and management outcome monitoring needs.

19. Preferably, the estuary will have an annual action plan, part of which will present the estuary's targets for the forthcoming year on each of the performance indicators (with the targets based on the resources expected for the forthcoming year). During the period over which the CCMP is being prepared, the action plan can be the same as, or

at least compatible with, the estuary's annual work plan. After the CCMP has been completed and approved, the management monitoring process would be part of the estuary's plans for each subsequent year.

20. Finally, of course, the process should be one that the estuary can feasibly implement with as low a cost in dollars and staff time as possible.

MAR 11, 1992

Tasks and Schedule for Pilot NEPs

The Urban Institute will develop an outcome assessment/monitoring "model" that includes draft components for:

* Summary of model characteristics
* Desired performance indicator characteristics
* Candidate performance indicators
* Illustrative breakout characteristics
* Reporting formats
* Sample explanatory and contextual information
* Candidate sources of data and, where necessary, sample data collection procedures

Pilot NEPs will be provided these draft materials as part of working group activities to help the working group shape the outcome assessment process and procedures to meet local needs.

Step 1: Establish a Working Group.

This group should consist of the persons expected to design the local outcome assessment process with the assistance of the Urban Institute. The group should consist of approximately 6-10 persons. It should contain persons representing each of NEP's primary committees, such as the technical advisory committee, the citizens advisory committee, and the policy committee. It should contain persons familiar with the scientific issues, but they should also be pragmatic individuals with a sense of what is likely to be needed by management/policy making officials and, ultimately, the public.

The group should plan to operate as a group for approximately 12 months. During the first 4-5 months the group will shape the process. During the next 6-7 months, the group will oversee the pilot testing of the procedures and reporting process. In its final 1-2 months, the group will develop its recommendations as to long-term implementation for the process (such as which components should be discontinued, extended, expanded, etc.).

The following sections present an illustrative agenda for the working group for its activities during the process design stage.

Step 2: Working Group Activities

Note: Each of the formal meeting sessions should probably be one-half day sessions, about 3 1/2 hours long. On occasion, a full-day meeting may be warranted.

Meeting 1: Define goals and objectives.

Advance Preparation: Review of materials provided by the Urban Institute, including the list of candidate system characteristics.

Meeting Agenda:

- Discuss and begin determination of the purposes of the outcome assessment process, including identifying the clients for the information that the process is intended to generate.
- Discuss the desired system characteristics; discuss fully the pros and cons, advantages and disadvantages of such outcome assessment. Discuss how the disadvantages of the outcome assessment process might be alleviated.
- Establish assignments for the next meeting.

Meetings 2 and 3: Identify and discuss the desired performance characteristics to be tracked.

(Note: These meetings are likely to require more than one-half day each.)

Advance Preparation: Before the first meeting review (a) the NEP's past materials relevant to environmental indicators (including measurements already being tracked) and to actions that the NEP has recommended be taken, or is likely to recommend in the future; and (b) the Urban Institute's draft list of candidate characteristics of performance indicators and illustrative set of candidate performance indicators. For the second meeting, perhaps divide the group into sub-groups, with each sub-group focusing on one category of performance indicator. Ask each such sub-group to provide candidate indicators, along with a rationale and discussion of problems associated with each indicator. The sub-groups probably should meet at least once before between the meetings.

Meeting Agenda:

- Discuss each category of performance indicator, the utility of such categorization, and select, at least tentatively, a set of categories by which to group desired performance indicators.

- Discuss the individual indicators, including each's relevance, likely validity, and usefulness.

Meetings 4 and 5: Discussion of data collection procedures and sources

Advance Preparation: Before the first meeting, review the NEP's current data collection procedures and sources and the Urban Institute's summary of data collection procedures relevant to the NEP's list of performance indicators. (The latter will be developed by the Urban Institute for each pilot estuary based on its examination of the NEP's current data efforts and efforts that have been tried elsewhere.) Before the second meeting, again divide up into sub-groups, by category of performance indicator. Ask each sub-group to examine the possible data collection procedures and sources for each indicator.

Meeting Agenda:

- Discuss the data sources and data collection procedures needed for each performance indicator that remain candidates (based on the determinations made at the previous meetings). Group the indicators by common data collection procedures. For example, representative surveys of citizens might be used to obtain data simultaneously on a number of indicators relevant to changes in citizen behavior from activities such as estuary protection campaigns.

- Examine the likely costs and other difficulties associated with the various data collection procedures. At the same time, consider ways to reduce the costs (and the corresponding reduction, if any, in the validity and accuracy of the resulting information.

Meeting 6: Decisions on performance indicators and data collection procedures; begin discussion of breakouts, report formats, and the pilot test.

Advance Preparation: Review of the material generated at the prior sessions. Review Urban Institute material on candidate breakouts and report formats.

Meeting Agenda:

- Make decisions as to the performance indicators and data sources.

- Identify breakouts for each performance indicator that will be useful to estuary managers/officials (Such as breakouts by geographical segment of the estuary study area, political jurisdiction, proportion of impaired sections by likely cause, type of pollutant, etc.)

- Select the report format(s) likely to be most useful to managers/officials.

Meeting 7: Detailed plans for Pilot Test

Develop details for the pilot test of the procedures. This should include a determination of who does what, by when. Step 3, below, indicates the activities for which plans need to be made.

Step 3: Pilot Test

The pilot test will include the following tasks:

- Tabulation of already available data to put into the form required by the performance indicators.
- Testing of revised or new data collection instruments (such as citizen surveys).
- Development of indices and other summary indicators--to translate numerous component indicators/parameters (and possibly highly technical parameters) into fewer, but understandable summary indicators.
- Testing of the report formats, including displays of important breakout information (such as to provide water quality indices for various segments of the estuary study area).

Throughout this step, the working group should oversee the tasks and resolve the inevitable problems and other procedural issues that arise during the pilot test.

Step 4: Review of Pilot Test Results and Recommendations For the Future

The working group should reconvene to:

- Review the pilot test results,
- Consider difficulties that arose and identify what needs to be done to correct problems in the future,

- Estimate the costs of an on-going process, and

- Make its recommendations as to future implementation of the manager outcome assessment process.

ESTUARY MANAGEMENT OUTCOME MONITORING PROJECT
STEERING COMMITTEE MEETING

APRIL 30, 1992
THE URBAN INSTITUTE
2100 M STREET, N.W.
5TH FLOOR
WASHINGTON, D.C. 20037
(202) 857-8605

TENTATIVE AGENDA

9:00 INTRODUCTIONS AND ORIENTATION TO THE PROJECT

- -objectives and purposes
- -schedules
- -pilot sites and field activities

OUTCOME MONITORING

- -system characteristics
- -characteristics of performance indicators
- -specific performance indicators

12:00 LUNCH AT THE INSTITUTE

1:00 ADVISORS DISCUSS OUTCOMES OF ESTUARY PROGRAMS

- -breakout groups discuss indicators
- -reconvene for committee discussion and advice to team

WORK TASKS AND SCHEDULES FOR THE NEXT PHASE

- -the pilot estuaries
- -field site procedures
- -next meeting for steering committee

3:00 ADJOURNMENT

Outcome Monitoring for Estuary Managers Steering Committee

Mr. Robert Bendick
Deputy Director
Department of Environmental Conservation
50 Wolf Road
Albany, NY 12233
518/457-0975

Mr. Jeff Benoit
Coastal Zone Management
100 Cambridge St., 20th Fl.
Boston, MA 02202
617/727-9580

Mr. Hal Bickings
RR1, Box 15
Bridgeton, NJ 08302
609/785-0074
455-0159

Mr. John Costlow
201 Ann Street
Beaufort, NC 28516
919/728-4027

Mr. Bill Eichbaum
World Wildlife Fund
1250 24th St., SW
Suite 400
Washington, DC 20037
202/293-4800

Mr. Ronald G. Embry
c/o Exxon Baytown Refinery
P.O. Box 3950
Baytown, TX 77522
713/425-3300

Ms. Eugenia Flatow
Coalition for the Bight
121 Avenue of Americas
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New York, NY 10013
212/431-9700

Mr. Kevin P. Gildart
Bath Iron Works
700 Washington Street
Bath, ME 04530
207/443-3311

Mr. Andy Manus
State of Delaware
Department of Natural Resources
and Environmental Conservation
89 Kings Highway
P.O. Box 1401
Dover, DE 19903
302/739-4411

Ms. Nancy McKay
Executive Director
Puget Sound Water
Quality Authority
P.O. Box 40900
Olympia, WA 98504-0900
206/464-7320

Ms. Beth Millemin
Coast Alliance
235 Pennsylvania Ave., SE
Washington, DC 20003
202/546-9554

Mayor Paul Noto
Village Hall
Mamaroneck, NY 10543
914/381-5500

Mr. Steve Richie
Regional Water Quality
Control Board
2101 Webster St., Suite 500
Oakland, CA 94612
510/464-0516

Ms. Dixie Sansom
Florida State Representative
P.O. Drawer 373697
Satellite Beach, FL 32937-0697
407/777-8100
773-5212

Ms. Amy Zimpher
San Francisco Estuary Project
P.O. Box 2050
Oakland, CA 94604-2050
510/464-7990
744-1952

Ex-Officio

Ms. Loretta Barsamian
W-73
75 Hawthorn Street
San Francisco, CA 94105
415/744-1953

Mr. Jim Burgess
Chief, CPD
OCRM/CPD
1825 Connecticut Ave., SW
Room 724
Washington, DC 20235
202/606-4152

Ms. Elizabeth Jester
Chief, Monitoring Division
U.S. Environmental Protection Agency
401 M Street, SW, (WH-553)
Washington, DC 20460
202/260-7046

Ms. Marian Mlay
U.S. Environmental Protection Agency
Coastal Protection Division
499 South Capitol Street, SW (WH-556F)
Fairchild Building, Room 811
Washington, DC 20003
202/260-1952

Ms. Gwen Ruta
EPA Region 1
JFK Federal Building
Boston, MA 02203
617/565-4423

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4/27/92

Monitoring Branch Highlights for OWOW National Meeting

- Intergovernmental Task Force on Monitoring having its second meeting May 20 - 21. EPA chairs this Task Force, with USGS as vice chair. Four Task Groups (on national monitoring framework, environmental indicators, data collection methods, and data information sharing) have been meeting and will report results at the May meeting. Goal is preliminary recommendations to OMB in December, and final recommendations and implementation the two years following. Eight federal agencies (EPA, USGS, NOAA, Corps, USDA, Energy, FWS, and OMB itself, and 8 states sit on the Task Force. We set up an internal EPA advisory committee to ensure HQ and Regional EPA staff are informed and can contribute to this effort.

- Environmental Indicators. OW committee chaired by OWOW, many regional staff on 4 subcommittees -- biological integrity, human health, loadings, and designated uses. We're working closely with EMAP.

- 305(b). 1990 report issued March 17; printed copies due in May. State 1992 reports due April 1; 11 states at HQ as of April 17. Consistency workgroup for 1994 Guidelines will be formed soon.

- Volunteer Monitoring. Third National conference a big success, over 300 attendees. Volunteer groups will form a National Association. We urge Regions that have not already done so to designate a volunteer monitoring coordinator.

- Biological monitoring. Workgroups just formed for Lake and for Estuary Rapid Bioassessment Protocols. We're also reviewing the USGS NAWQA biological protocols for consistency with ours.

- STORET Modernization

  - Staff workgroup formed to help Executive Board guide modernization effort.

  - Nationwide user needs interviews scheduled. In person in Regions 3,4,5,6,9, Tallahassee, Sacramento, and HQ. Video conferences in Regions 1,2,7,8,10. We plan a national users conference to discuss results and options in October or December 1992.

- GIS. HQ has a GIS, and is acquiring data for it. We hope to draw on the successes of and lessons learned in the Regional GIS programs -- Bob King is overseeing this effort.

Office of Water Systems Modernization
ISP Interview Schedule

April 1,2,3	JAD/Interviews	Region III	Completed	Chuck Kanetsky FTS-597-8176
April 14,15,16	JAD/Interviews	Region V	Cancelled	John Miller FTS-353-7210
April 21,22,23	JAD/Interviews	Region VI	Completed	Charlie Howell FTS-255-2289
April 29	Discussion	Region I	Scheduled	Ray Thompson FTS-828-6372
May 4,5	JAD/Interviews	Sacramento	Scheduled	Sheryl Baughman FTS-460-4923
May 6,7	JAD/Interviews	Region IX	Scheduled	Olaf Hansen FTS-484-1993
May 19	Discussion	Region II	Video Conf. 2:00-4:00 ET	Randy Braun FTS-340-6692
May 28	Discussion	Edison	Video Conf. 2:00-4:00 ET	Randy Braun FTS-340-6692
May 20	Discussion	Region VII	Video Conf. 3:00-5:00 ET	John Helvig FTS-276-5002
May 21	Discussion	Region VIII	Video Conf. 3:00-5:00 ET	Jim Luey FTS-330-1425
May 27	Discussion	Region X	Video Conf. 4:00-6:00 ET	Gretchen Hayslip FTS-399-1685
June 11,12	JAD/Interviews	Tallahassee	Scheduled	Dave Gowan 904-487-0505
June 9,10,11	JAD/Interviews	Region IV	Scheduled	Lorinda Gronner FTS-257-2126
June 18,19	JAD/Interviews	Headquarters	Scheduled	Bob King FTS-260-7028
July 1,2	Jad/Interviews	Headquarters	Scheduled	Bob King FTS-260-7028

EPA's Office of Water (OW) has begun an effort to modernize the STORET/BIOS/ODES data base management systems. The OW Office of Wetlands, Oceans and Watersheds will be conducting Regional visits and video conferences during April, May and June to gather information, ideas and concerns from interested people in the Regions and States. Regional visits will include one-on-one interviews with Division and Branch level managers and a two-day Joint Application Development session with Regional and State participants to focus on the current and future water quality information needs. Two-hour video conferences will be held in Regions where visits could not be arranged. If you have any questions, call the Regional contact above.

What is Joint Application Design (JAD)?

JAD is a structured meeting, led by an impartial session leader, designed to enable you to concisely specify business requirements. Two definitions for JAD are cited:

> "A structured meeting designed to extract high-quality information from users in a compressed timeframe using visual aids and a workshop environment to enhance the process."
>
> "An approach, using a neutral question-elicitor to lead users through a structured, yet flexible process to reach consensus about a pre-determined subject."

The process takes the place of independent interviews conducted by systems analysts and replaces that with a structured meeting in which key users attend. This way, issues are settled immediately, decisions are made more quickly, the communication between the participants is defined more clearly, and you provide direct input into the design of the future business system.

The use of JAD has been documented in many companies to enhance productivity as much as 60%. The process is a workshop. During the JAD session, all participants will work hard to define their requirements. The session leader will ensure that the meeting stays on course and that the deliverables are produced. This saves time, ensures that nothing is missed, and that all participants are heard.

Water Quality Monitoring JAD Agenda

The purpose of the JAD workshop will be to define the information needed by State and Regional environmental managers to plan, operate, and evaluate ambient water quality and biological monitoring programs. The workshop is not intended to address the technological aspects of a new information systems environment. We will focus on the requirements for those programs from a business perspective, such as the critical decisions and program actions that must be supported, and the information needed to support those decisions and actions.

JAD SESSION AGENDA

DAY 1 8:30 - 4:00

1. **Introduction** - This step will kickoff the meeting and review the administrative topics, such as workshop schedule, personal introductions, walkthrough of the agenda, discussion of workshop groundrules, and fielding of questions about the process.

2. **Project Purpose and Scope, and Workshop Purpose** - This step will validate a statement of project purpose and scope, and review the objectives of the workshop.

3. **Environmental Programs** - In this step we will elicit the relevant water quality monitoring programs, e.g., 301(h), NEPs, EMAP, in which the participants are involved. For each program, we will identify the essential uses of monitoring information, such as the decisions that must be supported, the types of conclusions the information must be able to support, and the actions that are taken as a result of using the information.

4. **Information Needs** - In this step we will elicit the information needs to support the monitoring programs identified. Think of information needs as groups of data items used together in data collection, analyses, reports, etc. We will then link the information needs to the WQM programs (from step 3). Note that during this session we will not be collecting information about each data item used in your water quality-related programs.

DAY 2 8:30-4:00

5. **Data Problems** - During this step we will identify data problems that exist today or are expected to impact the future. The discussion will focus on identifying specific problems that relate to each of the following characteristics of data quality:

> *Completeness* - All transactions and all items for each transaction are available.
>
> *Availability* - Types of needed data are available in the information environment.
>
> *Accessibility* - Data is easily accessible by all appropriate users from the information environment.
>
> *Accuracy* - Values are correct for certain items of data.

Consistency - Data values that need to be the same are in fact the same across the information environment (particularly interested in data relationships across systems).

Precision - Data is at a sufficient level of detail to support its intended usage.

Timeliness - Data is available after a sufficient period of time from the point when the initial business event occurred (that required the data).

Validity - Data collected is what is purports to be? Is it what we really mean?

In addition, each problem will be linked to the information needs (from step 4) involved and the uses of water quality monitoring information (from step 3) that are impacted by the problem.

6. System Capabilities - In this step we will identify specific capabilities and features that would make a difference in your job or positively affect the decisions, conclusions, or actions taken as a result of water quality monitoring.

7. Workshop Results Review - During this step we will review the work accomplished and address any questions about the results.

8. Issues Review - In this step we will review each issue and test whether it has been resolved from discussion. For unresolved issues, we will identify a lead responsible person and assign timeframes for a proposed a resolution.

9. Workshop Evaluation - As a final step, we will collect feedback from you on a simple evaluation form. We consider this to be an important step for assessing the results and for refining the process as necessary.

Note that we will allocate 1 hour for lunch on each day. The exact time will depend on the current discussion and will be based on a logical breaking point.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
WASHINGTON, D.C. 20460

APR 23 1992

OFFICE OF WATER

MEMORANDUM

SUBJECT: GIS Workstation Availability

FROM: Dave Davis, Deputy Director
Office of Wetlands, Oceans and Watersheds

TO: OWOW Division Directors
OWOW Branch Chiefs
OWOW Section Chiefs

OWOW is very pleased to announce the acquisition of a Geographic Information System (GIS) workstation located in Room 835 of the East Tower. GIS is a tool to efficiently display spatial data derived from maps, air photographs, satellite imagery, land records and existing digital databases. It provides a mechanism to integrate spatial data for cross-program, multimedia, and interdisciplinary environmental assessment, planning, and decision-making. It is extensively used in the Regions and States and can be a significant tool in implementing EPA initiatives including the watershed protection approach, nonpoint source pollution control, wetlands preservation, coastal programs, water quality status and trends, etc.

Bob King in AWPD Monitoring Branch is currently reviewing Regional GIS applications for mounting on this workstation to serve as examples of spatial analysis. These menu-driven applications can then be used to demonstrate capabilities for senior management and staff. A working knowledge of ARC/INFO is not necessary to use the system.

WORKSTATION TECHNICAL SPECIFICATIONS

Data General AViiON Series 4 Workstation with 28 megabytes RAM and 2 gigabytes disk storage. Input devices include 3¼ floppy diskette, CD/ROM, and 150 megabyte tape drives. Output devices include Ethernet connection to Postscript color printer and electostatic plotter in the WIC.

Demonstrations and basic training sessions for this system will be set up within the next two months. I encourage you to attend. Please contact Mary Baechtel, FTS-260-7057 if you are interested in accessing the system.

CC: Michelle Heller
Wendy Blake-Coleman
Cynthia Puskar
Regional Monitoring Coordinators

THE RESOURCES

EPA has developed the following materials that may be of help to volunteer monitoring programs:

- National Directory of Citizen Volunteer Environmental Monitoring Programs, EPA 503/9-90-004, April 1990.
- Volunteer Water Monitoring: A Guide for State Managers, EPA 440/4-90-010, August 1990.
- Volunteer Lake Monitoring: A Methods Manual, EPA 440/4-91-002, December 1991.
- The Volunteer Monitor (newsletter)
- Nonpoint Source News Notes (newsletter)
- Coastlines (newsletter)
- The Water Monitor (monthly newsletter)
- USEPA Nonpoint Source Information Exchange Computer Bulletin Board System (BBS) (tel: 301-589-0205). User's Manual, EPA 503/8-92-002, January 1992.
- Wetlands Hotline (tel: 1-800-832-7828)
- American Wetlands Month (brochure)
- Clean Lakes Clearinghouse (database. Tel: 800-726-LAKE)

Many of the EPA Regional Offices have prepared additional educational materials that are of value to volunteers. For further information on EPA's volunteer monitoring activities, write to:

Alice Mayio
Volunteer Monitoring Coordinator
USEPA, Assessment Division (WH-553)
401 M St. SW
Washington, D.C. 20460

United States Environmental Protection Agency | Office of Water Washington, D.C. 20460 | March 1992

EPA VOLUNTEER WATER MONITORING PROGRAM

EPA AND VOLUNTEER WATER MONITORING

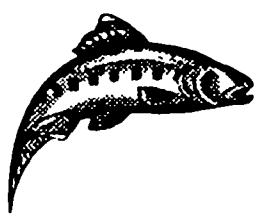
The U.S. Environmental Protection Agency's (EPA) Office of Water supports the volunteer monitoring movement nationwide.

Why does a Federal regulatory agency care about the efforts of citizen volunteers?

- Water pollution is a complex problem. We know that polluted wet weather runoff from areas such as farms, lawns, city streets, construction sites, eroded stream banks, and mines is the leading source of contaminants in our Nation's waters. EPA is required by statute to support and oversee State efforts to monitor water quality and locate and solve pollution problems. But State resources are limited. Citizen volunteer monitors can help by collecting good data.

- As citizens learn how to monitor their streams, lakes, wetlands, and coastal waters, they learn about water resources and how they work -- and about pollution. They learn how their everyday actions -- things as basic as how they apply pesticides to their lawns or how they dispose of their used automotive oil -- can affect the waters in which they fish or swim. They become involved in protecting water quality. They become, in short, stewards of their environment.

EPA therefore supports State use of volunteer data through grants and guidance and works to "spread the word" about volunteer monitoring through conferences, directories, and outreach. Additional EPA actions in support of volunteers will include a clearinghouse of volunteer monitoring information and increased coordination with other Federal agencies.



THE PROGRAM

In April 1991, EPA's Office of Wetlands, Oceans and Watersheds (OWOW) was created within the Office of Water. OWOW was established out of recognition that all our water resources are interconnected and require an integrated management and protection approach. OWOW's Watershed Protection Approach emphasizes monitoring and management activities on a basinwide scale; citizen participation in this approach is vital.

Each of OWOW's Divisions carry out activities that help support the volunteer movement:

- OWOW's Assessment and Watershed Protection Division issues monitoring guidance for States; coordinates with Federal and State agencies on monitoring issues; produces monitoring methods manuals; sponsors conferences and other information exchange activities; and supports State-level volunteer monitoring programs through the Section 314 (Clean Lakes) and 319 (Nonpoint Source) programs.

- OWOW's Oceans and Coastal Protection Division develops monitoring guidance related to coastal and marine waters; supports conferences and other information exchange activities; coordinates and manages the National Estuary Program and the Near Coastal Waters Program; and supports the use of grant funds under Section 320(g) to include volunteer monitoring in these programs.

- OWOW's Wetlands Division manages public education, information, and outreach activities related to wetlands protection (including the Wetlands Hotline and American Wetlands Month) and develops and improves approaches for wetlands protection.

THE ROLE OF THE EPA REGIONS

EPA's 10 Regional Offices are actively involved in volunteer water monitoring. Many of our Environmental Services Divisions and Water Management Divisions provide technical assistance relating to data quality control and laboratory methods; help coordinate volunteer programs within their Regions; manage Clean Lakes and nonpoint source grants; assist in training; and provide outreach and information exchange. Regional workshops are being held to bring volunteers together, build partnerships, and teach new methods.

11/12/91

VOLUNTEER MONITORING WORKPLAN

Objective 1: Establish leadership role in volunteer monitoring

Tasks:

1. Write memo from GG to Water Management Division Directors/ESD Division Directors informing them of upcoming volunteer conference and urging they appoint a volunteer monitoring coordinator and contact me with name. Include copy of The Volunteer Monitor and flyer/agenda for conference.

2. Hold conference call with Regional volunteer monitoring coordinators to:

   - give them details on conference and our support for State travel
   - ask for highlights of their activities, if any, in support of volunteer monitoring
   - explain headquarters involvement and ask for input on needed support, ideas for further activity
   - get them networking
   - assign them the task of finding out level of State-supported volunteer monitoring activity.

3. Establish contacts with other Federal agencies involved (or considering involvement) in volunteer monitoring. Inform them of upcoming conference, of EPA materials.

4. Maintain liaison with Regional volunteer monitoring coordinators, OCPD volunteer monitoring coordinator. Support and attend Regional workshops. Serve as information hub on EPA volunteer monitoring activities, publications.

Objective 2: Support volunteer monitoring conference through leadership on conference steering committee.

Tasks:

5. Work with grantee (Izaak Walton League) to finalize agenda, develop outlines for presenters, identify speakers, promote conference, etc.

6. Develop conference presentations/support material for EPA personnel.

7. Hold periodic steering committee meetings (conference calls)

8. Attend and participate in volunteer monitoring conference; provide needed facilitation, coordination. Ensure attendance/participation of Regional coordinators. Ensure development of high quality proceedings.

Objective 3: Finalize methods manuals for volunteers.

Tasks:

9. Print and distribute final lake methods manual.

10. Review first draft and develop second draft of rivers methods manual (River Watch Network grant).

11. Identify panel of peer reviewers. Coordinate technical review of river methods manual.

12. Develop third draft of rivers methods manual based on peer review.

13. Finalize river methods manual and prepare for printing.

14. Print and distribute river methods manual.

Objective 4: Develop additional materials in support of volunteer monitoring.

Tasks:

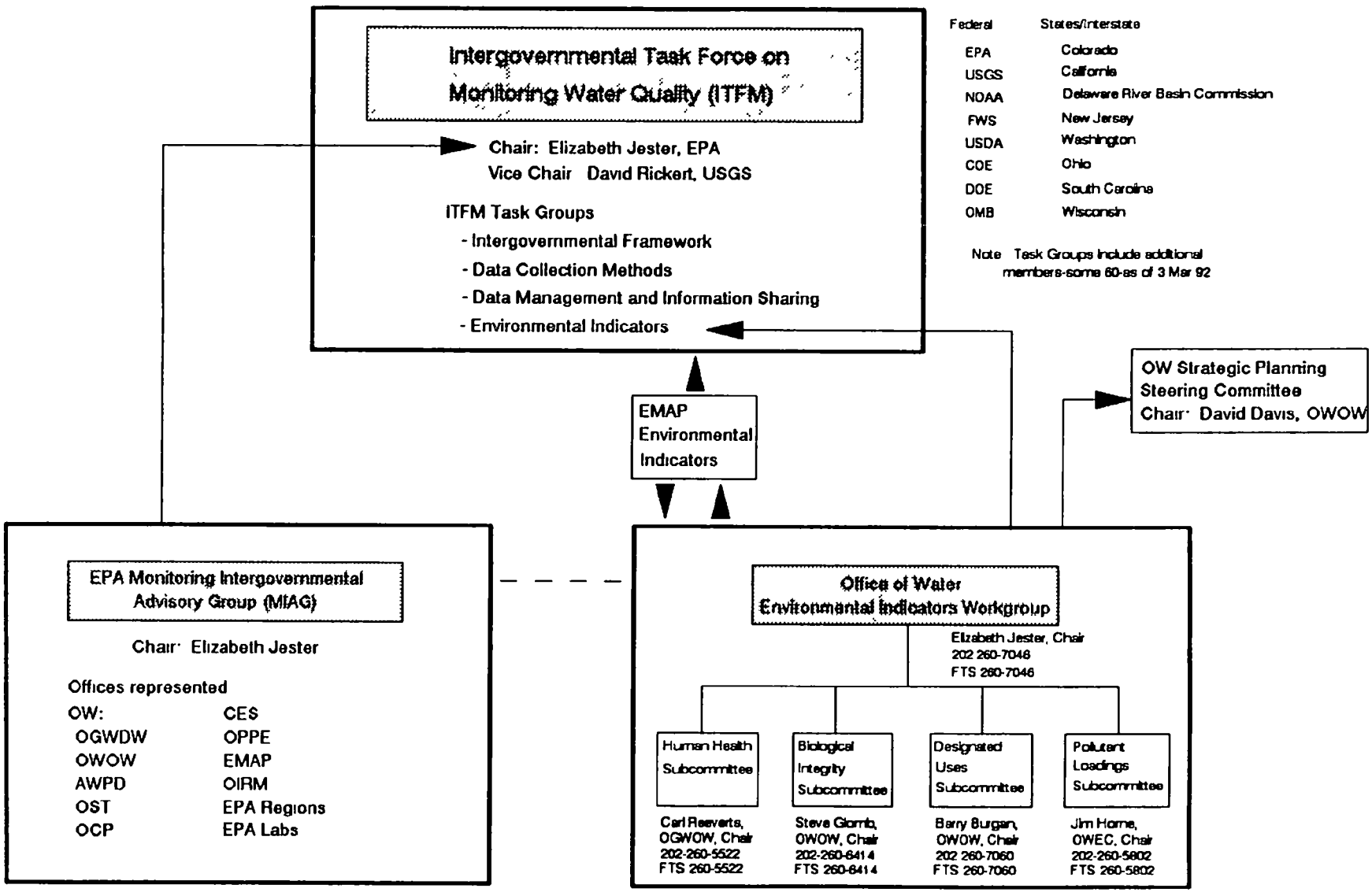
15. Draft brochure explaining EPA/OWOW involvement in volunteer monitoring, uses of volunteer data, etc. (for OWOW information folder, outreach purposes).

16. Finalize and print brochure.

17. Support development of fourth edition of Directory of Volunteer Monitoring organizations. Support continuing publication of The Volunteer Monitor.

18. Produce other materials as needed.

Relationship of Monitoring and Indicators Committees



FACT SHEET
INTERGOVERNMENTAL TASK FORCE ON MONITORING WATER QUALITY

ISSUE: Hundreds of millions of dollars are spent annually monitoring water quality in the United States. Nevertheless, the resulting data fall short of the information needed to effectively manage water quality and associated natural resources and to protect human health and the environment. Water-quality monitoring in the United States is performed by thousands of Federal, State, local, public interest groups, private groups, and individuals for a wide variety of purposes. Roles, objectives, and responsibilities are not clearly defined, and no intergovernmental strategy links these fragmented efforts into a comprehensive nationwide effort to support effective decisionmaking. Lack of clear leadership and lack of resources have contributed to a lack of coordination and cooperation and the inability to obtain an accurate, consistent picture of water quality over time.

BACKGROUND: These varied monitoring entities perform three quite different kinds of monitoring (status and trends assessment, management/regulatory program development, and compliance/program evaluation).

- On the Federal level, many agencies monitor for different purposes and parameters: Department of the Interior (DOI), Environmental Protection Agency (EPA), U.S. Department of Agriculture (USDA), Department of Commerce (DOC), Department of Defense (DOD), Department of Energy (DOE), and others.

- On the State level, agencies manage their own monitoring programs for their own water-quality planning and assessment purposes. States report some of their information to EPA which publishes the biennial National Water Quality Inventory (the "305(b) report") which gives an aggregated picture of the nature and extent of water-quality problems and activities across the Nation to address them. State monitoring programs are usually designed to identify problem waters; therefore, monitoring efforts are generally concentrated in waters known or suspected to be impaired or waters of highest priority.

- On the local and private level, facilities monitor for compliance, and States monitor to verify their findings. Those data are not necessarily factored into other local, regional, or national evaluations of water-quality conditions.

- On a public interest group level, a few organizations such as the Nature Conservancy maintain data bases with valuable water-quality information, which is sometimes used at the State level, but rarely at the national level.

- Private citizens engage in water-quality monitoring throughout the country, often through State-approved programs. These efforts can produce valuable baseline and screening data on waters that would otherwise be unmonitored. Use of volunteer data is uneven.

PROBLEM: Problems have been associated with water-quality monitoring activities. They are highlighted below:

- Lack of coordination among the large numbers of monitoring entities results in duplication and inefficiencies in collecting and using data.

- Quality assurance and quality control procedures are generally inconsistent and inadequate. This is especially true of field sampling procedures, sample preservation techniques,

INTERGOVERNMENTAL TASK FORCE ON MONITORING WATER QUALITY

Status of Activities; April 20, 1992

MISSION

Our mission is to develop and initiate implementation of a strategic plan to achieve effective collection and presentation of water-quality data to provide a basis for decisionmaking.

This requires implementing a framework to:

- Integrate monitoring efforts
- Use resources more effectively
- Obtain comparable data and consistent reporting of status and trends of water quality

SCOPE

The scope of the ITFM includes water-quality monitoring and the resulting collection, management, and use of water-quality information to fulfill the following purposes:

- Identify emerging problems
- Assess status and trends
- Develop management and regulatory programs
- Evaluate program effectiveness and compliance
- Wisely manage the use of environmental and economic resources

FULL ITFM MEETINGS

January 29 - 30, 1992 Washington, DC

- Adopted Mission, Scope, Terms of Reference, established four Task Groups and agreed on initial direction and products for them.

May 20 - 21, 1992 Washington DC

September 9 - 10, 1992

INTERGOVERNMENTAL FRAMEWORK TASK GROUP

Objectives:

1. Define information that water quality monitoring programs need to provide over the next decade.
2. Develop a conceptual model for water quality programs to meet the defined information needs.
3. Recommend an intergovernmental monitoring framework to meet defined information needs and improve efficiency of existing programs.

Status:

January 30, 1992, Washington DC Organizational meeting

March 5 - 6, 1992 Las Vegas, Nevada

- **Model monitoring program design:** Considered draft by Stu MacKenzie (USGS); will consider revised version at next meeting

- **Matrix to record federal monitoring program information:** Considered draft by USGS and EPA; will consider revised version at next meeting

- **National monitoring vision statement and policy principles**; Mike Llewelyn (Washington State) and Nancy Lopez (USGS) will develop a draft for next meeting

- **Major monitoring questions to be answered for each of the five major monitoring types**; Group brainstormed list; will refine for next meeting.

- **Outline for December 10, 1992 recommendations to OMB**; will consider a draft at next meeting.

- **Items for glossary of terms and definitions**; will submit additions to consider at next meeting.

ENVIRONMENTAL INDICATORS TASK GROUP

Objective: Define questions indicators should answer, recommend core group of indicators for use governmentwide, and a process for reporting and improving them over time.

Status:

January 30, 1992, Washington DC Organization meeting

March 4, 1992, Washington DC

- **Defined environmental indicator**; Group defined as a measurable feature of the ecosystem which singly or in combination provides managerially and scientifically useful evidence of ecosystem quality, or reliable evidence of trends in quality.

- **Questions indicators should answer**; group developed list

- **Indicator groupings**; discussed, Wayne Davis (EPA) will recommend at next meeting

- **Indicator selection criteria**; discussed, Sara Gerould (USGS), Ruth Chemerys (EPA), Chris Yoder (State of Ohio) will present overview of criteria from different monitoring programs at next meeting

- **Outline of Recommendations to OMB**; Discussed draft, will submit ideas to David Pollison and have revised draft for next meeting.

April 20, 1992

- **Outline of Recommendations to OMB**; group approved revised outline; final comments to David Pollison by May 4.

- **Indicator groupings**; Group discussed groupings by category (fish, macroinvertebrates, habitat, loadings), resource area (streams, etc) and designated uses. Wayne Davis (EPA) and Sam Stribling (contractor for EPA) will produce next draft.

- **Indicator selection criteria**; Sara Gerould (USGS), Ruth Chemerys (EPA) and Chris Yoder (State of Ohio) will aggregate their list into criteria categories. New Task Group participants from Forest Service, Soil Conservation Service, and Fish and Wildlife Service will provide their selection criteria to Ruth.

- **Glossary of Terms**; Group recommended terms to include in ITFM Glossary. Sam Stribling will collect and produce next draft.

- **Additional agency representation**; EPA will check with Department of Transportation, Park Service, BLM, Army, Minerals Management Service, and Bureau of Reclamation to see if they use indicators. Members felt a representative of a Western State should be included.

DATA COLLECTION METHODS TASK GROUP

Objectives: Obtain comparable data collection methods where possible; recommend standard data qualifiers that allow data to be shared with know levels of confidence.

Status:

January 30, 1992, Washington, DC Organizational meeting

February 20, 1992 Arlington, Virginia

- **Comparability in field techniques, sampling and handling water and sediment**; discussed, Marty Brossman (EPA) and Wayne Webb will write description for next meeting

- **Comparability in analytical methods**; discussed, Merle Shockey and Ann Strong (Corps) will write description for next meeting.

- **Comparability in biological methods**: discussed, Chuck Facemire (USFWS) and Russ Sherer (State of South Carolina) will write description for next meeting

- **Comparability in data to enable sharing;** Discussed; group will submit ideas on minimum amount of information associated with a value and with a sample that is needed to enable comparability of data (chemical, physical or biological) in laboratory or field.

- **Sample Control Center description/methods and ground water minimum data set**; discussed, Marty Brossman (EPA) will provide description for next meeting

- **EPA's EMMC;** Discussed comparable effort to Task Group within EPA. Ort Villa (EPA) will describe at next meeting.

- **Performance-based analytical measurements system in EMAP**; Heard presentation by Bob Graves (EPA/EMAP)

May 5, 1992, Arlington, Virginia

DATA MANAGEMENT AND INFORMATION SHARING TASK GROUP

Objectives: Ensure data in various systems can be easily shared at known levels of confidence by: 1) Developing a process design or model for data sharing; 2) Developing a common data dictionary; and 3) Identifying and coordinating with the various groups concerned with data sharing.

Status:

January 30, 1992, Washington DC Organizational meeting

March 23 - 24, 1992, Fairfax, Virginia

- **Data sharing process**; Jim Schornick and John Briggs (USGS) presented various options for a process design; discussed various components needed including a distribution network, organizational structure, and data model design; John Briggs (USGS) will develop options and a preliminary approach for next meeting.

- **Data dictionary**; discussed the essential need for using the same terminology; as a start, Bob King (EPA) and Jim Schornick (USGS) will develop a glossary for the task group for the next meeting.

- **Description of other data sharing activities**; Brand Neimann and Chris Bradbury (EPA) and Don Dolnack (USGS) presented what their offices are doing with respect to data bases and described other organizations also working on data sharing; Brand Neimann and Wendy Blake-Coleman (EPA) will start developing a report which will describe these activities which will be part of the first year's report.

May 19, 1992, Fairfax, Virginia

April 13, 1992

SCHEDULE FOR COMPLETING SECTION 6217(g) MANAGEMENT MEASURES GUIDANCE

April 6-24	o	Further Consultations With Interested Parties
April 9	o	Detailed All-Day Meeting with Bob Wayland, Dave Davis and Trudy Coxe - Options/recommendations for each management measure - Cost and effectiveness information - Preliminary finding of economic achievability analyses
April 30	o	First Draft of Final Management Measures Guidance drafted and mailed to Work Group to review
	o	First Draft of most Economic Achievability Analyses completed
May 4-15	o	Work Group meetings on management measures guidance with EPA, other Federal and State representatives
	o	EPA Work Group Meeting
May 21	o	Brief Assistant Administrator/Assistant Secretary on major issues
May 25	o	Brief OMB on status and general substance of analyses
May 31	o	Second Draft Economic Achievability Analyses completed
June 1	o	First Draft Regulatory Impact Analysis completed
June 4	o	Briefing of Bob Wayland, Dave Davis and Trudy Coxe - Results of economic achievability analyses - Regulatory impact analysis - Final decision (subject to change based on public comment on costs and economics)

June 4-Aug.4	o	Changes to Final 6217(g) Guidance, Responsiveness Summary, Economic Achievability Analyses, and Regulatory Impact Analysis (Assumption is that changes are minor)
June 8	o	Notice for Public Comment on Economic Achievability Analyses (30-day)
June 8-26	o	Briefings of Senior officials at USDA, DOI, DOT, USFWS, Army COE, TVA, FERC and other Federal agencies
	o	Copies of all drafts sent to Regional Water Management Division Directors for Regional review
June 29	o	Conference call with Regional Water Management Division Directors to solicit their comments and concerns on the Draft Guidance
June 8-Jul 14	o	Responsiveness Summary for 6217(g) Drafted
	o	Second Draft Regulatory Analysis Drafted
July 8	o	Public Comment Period for Economic Achievability Analyses End
July 15	o	Briefing of Bob Wayland, Dave Davis and Trudy Coxe - Summary of public comment on economic achievability analyses - Responsiveness summary for 6217(g) (Draft) - Regulatory impact analysis (Draft) - Federal agency comments/concerns - Proposed Final 6217(g) (for Red Border Review)
July 22	o	Brief OMB on results of Economic Achievability Analysis and Regulatory Impact Analysis
August 5	o	Brief Assistant Administrator/Assistant Secretary on status, public comments on the Economic Achievability analysis, and the Regulatory Impact Analysis

August 13	o	Second Conference Call with Regional Water Management Division Directors
August 20	o	Assistant Administrator submits section 6217(g) Guidance for Red Border Review - Includes economic achievability analyses, responsiveness summary, and regulatory impact analysis
August 26	o	Brief OMB on contents of the Final Guidance submitted to the Regions for Red Border review
Sept. 7	o	Final Conference Call with Regional Water Management Division Directors
Sept. 8	o	Red Border Review ends
Sept. 10	o	Briefing of Bob Wayland, Dave Davis and Trudy Coxe - Red Border Comments - Regulatory Impact Analysis
Sept. 14	o	Closure meeting with Hank Habicht
Sept. 16	o	Final section 6217(g) Guidance submitted for OMB Review - Includes economic achievability analyses and regulatory impact analysis
Sept. 30	o	OMB Review Completed (assumes 14 days and no distribution to other Federal agencies)
October 5	o	Final 6217(g) Guidance to Assistant Administrator
October 19	o	Assistant Administrator sign the Guidance.

Implementation of §303(d)

Critical Issues for this summer

Background

The agency has taken several steps over the last year to implement CWA §303(d). The statute requires States to identify waterbodies that do not or will not attain standards, priority rank the waters, and develop Total Maximum Daily Loads (TMDLs) to establish the specific pollution reductions necessary to attain standards. EPA must review and approve State lists and TMDLs. If a State fails to implement 303(d) in an approvable manner, EPA has a duty to establish lists and TMDLs.

AWPD issued program guidance in April, 1991, and is in the process of revising the Water Quality Management regulations. Key implementation provisions from the guidance and regulation revisions are as follows:

- State submittals are due April 1 of even numbered years (coincident with 305(b));
- States must target those waters for which a TMDL will be developed during the two-year period following submittal;
- States are encouraged to target challenging high priority waters that involve problems such as nonpoint source pollution;
- a phased approach to TMDL development may be used in complex situations;
- TMDLs should address non-chemical stressors where they are precluding the attainment of designated uses, biocriteria, or specific numerical criteria and where we have information about the relationship between quantified stressor measures and standards attainment.

In subsequent guidance and in State-EPA workshops held in all Regions this past winter we have stressed that 303(d) provides an opportunity to integrate programs and address problems on a watershed-scale basis. Regional and Headquarters representatives have also stressed that the agency is serious about fully implementing these provisions.

Critical Issues

1. State submittals

   - Due April 1, 1992

- Procedures for delinquent submissions were developed at the February TMDL Coordinators meeting including a process for conditional approval

- Regions should be prepared to establish an EPA list including targeted waters if a State fails to make an approvable submission

2. Implementation Agreements

- Several Regions have established a Region-State workgroup to work out the details of targeting and TMDL development, review, and approval

- Permits, nonpoint, and other programs staff should participate in these workgroups

- State-EPA Implementation Agreements (formerly Technical Agreements) should be established or revised

3. TMDLs

- Informal goals for complex TMDLs were developed at the February Coordinators meeting

- Regions may withhold or recover grant funds to support TMDL development in the absence of an acceptable State program (40 CFR 35.155(b)(1))

- We have established an expert assistance team and are providing limited financial support for TMDL development

Notes/handout on the Habitat Cluster

April 8, 1992

Origin

Formed in response to the SAB report Reducing Risk; originally a workgroup under the Shapiro Committee; became an agency Cluster last fall

Goals

short-term goal is to review and analyze information and develop a range of strategic options for the Agency

long-term goals include providing a forum for information exchange, carry out specific activities and coordinate between Offices

Process

Analysis has focussed on (1) 15 topic papers that assess current knowledge and programs and develop options (see attached), and (2) an inventory of current EPA activities related to habitat

A strategic options document will be developed to present key findings and the Cluster's recommendations; draft is planned for this Spring, final by this Fall

A number of "immediate implementation" actions are currently being developed for presentation to the Deputy Administrator

Membership

See attached

Regional Participation

Regions seem to be very active in habitat issues (watershed projects, riparian policies, comparative risk analyses)

Regions are well-represented on the Habitat Cluster with Regions 3 and 5 particularly active

OW Participation

So far OWOW has been most active; OGDW is represented; OST and OWEC are not represented

TOPIC PAPERS AND LEAD AUTHORS

INFORMATION

- Classification systems - Michael Brody, OPPE
- Status and trends information - Jim Serfis, OFA
- Stressors and trends in stressors - Michael Slimak, ORD
- Monitoring methods and programs - Elizabeth Jester, OW
- Demographic and economic trends - Patrick McCabe, OPPE

SCIENCE

- Ecological/economic habitat values - Elaine Suriano, OSWER/P. McCabe, OPPE
- Risk-based geographic targeting - Ossi Meyn, OPPT
- Habitat quality criteria and indicators - Michael Slimak, ORD
- Restoration science and technology - Amy Sosin, OW

IMPLEMENTATION PROGRAMS AND POLICIES

- Incentives - Ralph Heimlich, OPPE
- Education/public-private partnerships - Maurice LeFranc, OPPE
- Acquisitions/easements programs - Molly Whitworth, OPPE
- Regulatory programs - William Painter, OPPE
- Non-EPA federal regulatory programs - Jim Serfis, OFA
- International activities - Franklin Moore, OIA

Habitat Cluster

HABITAT CLUSTER MEMBERS

Co-Chairs

Timothy Barry	OPPE
Bruce Newton	OW

Office Representatives

Jay Benforado	ORD
David Davis	OW
Mario Delvicario	Region 2
Thomas Dixon	ORD
Kathy Kaufman	OAR
Barbara Lamborne	OIRM
Allen Lucas	Region 4
Tom Marshall	OGC
Peter Marx	OCLA
Susan McDowell	Region 3
Ossi Meyn	OTS
Franklin Moore	OIA
Bill Painter	OPPE
Philip Ross	OFA
Margaret Rostker	OPP
Jim Serfis	OFA
Mike Slimak	ORD
Elaine Sommers	Region 10
Bob Springer	Region 5
Kathy Summerlee	OE
Elaine Suriano	OSWER
Cathy Tortorici	Region 7
Yvonne Vallette	Region 6
Tom Waddell	Region 1
Karen Hamilton	Region 8

Full Cluster Members

Jack Arthur	ERL-Duluth
Lou Blume	Region 5
Jeff Booth	OIRM
Tom Born	OPPE
Don Brady	OW
Michael Brody	OPPE
Fred Chanania	OSW/IO
David Deegan	OPP
Martin Dieu	OPPE
Rebecca Dils	OPPE
Thomas Dixon	ORD
Dianne Fish	OW
Will Garvey	OW
Suzanne Giannini	OPPE
Marilyn Ginsberg	OW
Steve Glomb	OW
Otto Gutenson	OPPE
Ralph Heimlich	OPPE
Roger Holtorf	OPPE
Elizabeth Jester	OW
Peter Jutro	ORD
Karen Klima	OW
Maurice LeFranc	OPPE
Susan MacMullin	OW
Janette Marsh	Region 5
Patrick McCabe	OPPE
Jill Minter	OWEC
Sue Norton	ORD
Tom Peterson	OPPE
Paul Ringold	ORD
Don Rodgers	OPP
Caren Rothstein	OW
Chris Solloway	OPPE
Amy Sosin	OW
William Steen	ERL-Athens
Ingrid Sunzenauer	OPP
Michael Troyer	ORD
Bob Ward	OGC
Dick Worden	OPPE
Arthur Weissman	OSWER
Molly Whitworth	OPPE
Louise Wise	OW
David Yount	ERL-Duluth

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